Amateur Radio

AUGUST, 1973

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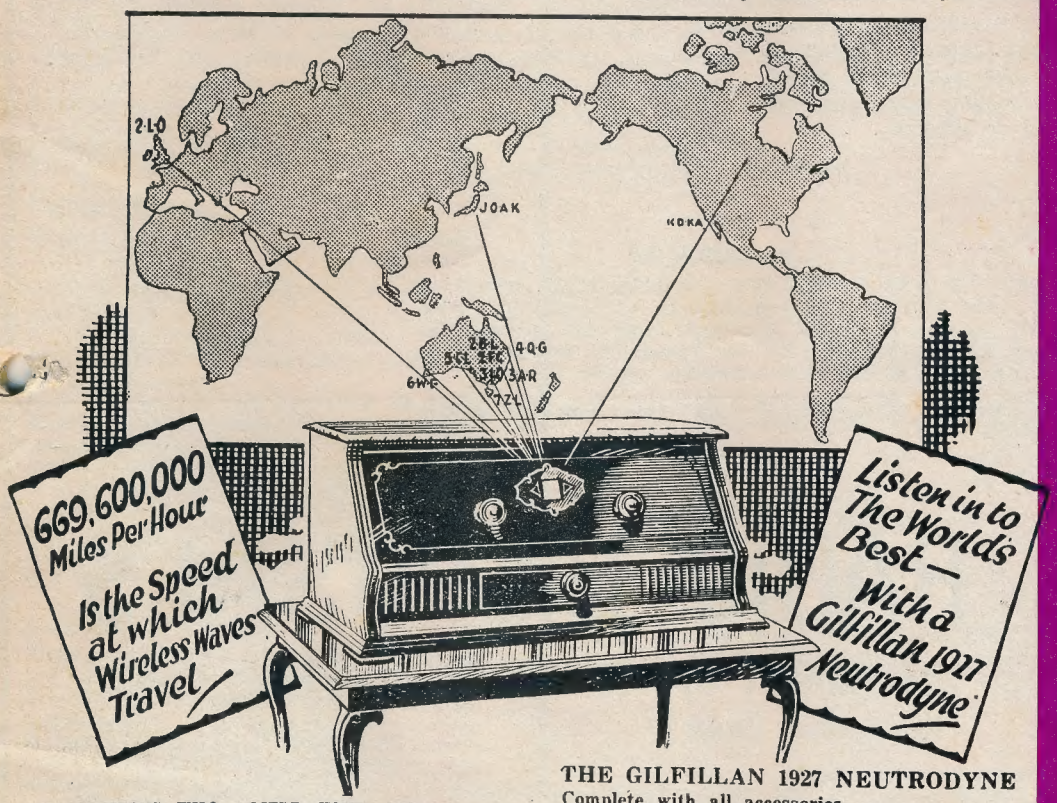

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- CQ OSCAR 6
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JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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FRONT COVER :
Broadcasting in Australia is 50 years old this month. Shortly after commencement, this was the type of receiver available to the listener. Note the price relative to today's prices, and the reminder of the speed of "wireless waves".

QSP

BROADCASTING INDUSTRY CELEBRATES ITS GOLDEN ANNIVERSARY

In August 1923 — 50 years ago this month — the then Postmaster-General, Hon. G. Gibson, MHR, formulated the first Regulations governing broadcasting in Australia.

The Wireless Institute extends its cordial expressions of goodwill and congratulations to the Broadcasting Industry on this auspicious occasion of its fifty years service to the listening public throughout the Commonwealth.

The early years were beset with many problems — both technical and administrative. They were overcome with the usual tenacity of purpose attributable to Australians as a people. With less experience than countries in other more advanced parts of the world, and with a dearth of equipment which would send the modern engineer to distraction, the Industry made good in its early stages of development when voices were heard saying that 'wireless' was a nine days' wonder, that the country couldn't afford to pay for it, that advertising should never be permitted and that only the city people could enjoy the benefit of such a costly venture.

But that was the very early days. Wireless was a mystery to most people. It needed promotion by men of vision, it needed public demonstrations, it needed good programme material, it needed to spread its wings into the rural area and the interior of this big country and above all it needed the devotion to duty and the expertise of its technicians and engineers.

The full story of its 50 years of progress and the way it overcame its difficulties would make a fascinating story in its complete context. The fact that it did is obvious by the modern engineering complex of even the lowest powered station today by its financial prosperity and its contribution to what is now an important part of the Australian way of life.

The Wireless Institute of Australia is proud to have been closely associated with the Industry in its early formulation and to have fostered many engineers and technicians who first became radio amateurs before seeking their livelihood within its many activities.

Elsewhere in this issue of Amateur Radio magazine is a brief article about the wireless amateurs' contributions to its success. The Institute joins with all other services in wishing the Broadcast Industry continued success in a world 'alive' with entertainment media. It has plenty to be proud about in celebrating its golden anniversary.

G. Maxwell Hull, VK3ZS
Federal Historical Section.

Remembrance Day Contest

AUGUST 18—19

THE FRIENDLY CONTEST

AT LEAST 700 LOGS REQUIRED

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1973 Cross Australia DXpedition

Keith VK3SS and Geoff VK3ZJS, both in Land Rovers, depart Alice Springs on 31st July heading across the TANAMI Desert for 1000 miles, thence down the west coast of VK6.

Scheds: 0230Z on 14.125 MHz
1100Z on 3.600 MHz nightly
1000Z on 3.650 MHz on Sundays

N.Z.A.R.T.

"It should be noted that all material presented in the (official N.Z.A.R.T.) broadcast from ZL2IY on 3900 kHz at 20.00 hrs. N.Z.S.T. on last Sunday of each month has the prior approval of the Post Office."

N.Z.A.R.T. Call Book 1973

DEADS.

'Darkness — emitting arsenic diodes.' According to ARNS Bulletin of April '73 'a recent development fabricated of gallium arsenide'. It is interesting to speculate on such a development.

Doppler anomaly on Oscar 6.

Writing in "The World above 50 Mc" in QST for May '73 W7JNK records that two Minneapolis amateurs, WOLER and WOMJS, had observed "inverted" Doppler effects on certain orbits of the Oscar 6 435 MHz telemetry beacon. The movement in the unpredicted direction was approx. 450 Hz lasting some 7 minutes only on evening north-bound passes in a window extending from 50 to 105 degrees west longitude. Observations are now being made on other satellites transmitting in this frequency area.

Radio Stations.

Feel aggrieved because your call sign details might be wrong? Spare a thought for the PMG's Radio Branch coping with 180671 authorised stations as at 31st March 1973. This figure includes 151943 mobiles, 6538 amateurs, 187 repeaters, 62 gliders and 7 space stations. Of the amateur stations 4422 were unrestricted and 2016 restricted; about 30% of the total were in N.S.W. and another 30% in Victoria; 120 were in A.C.T. and 48 in VK8,

SLOW MORSE.

Several members have enquired lately about the availability of slow morse practice tapes. These were obtained until last year from the R.S.G.B. but they advise that such tapes are no longer available. Efforts are being made by "Magpubs" to obtain an alternative source of supply. Perhaps even this short article might evoke some response within Australia. A slow morse course is available through our good friends Wm. Willis and Co. Pty. Ltd. and this was reviewed in January A.R. but practice material for home use, as opposed to teaching aids, seems hard to find.

Lionel L. Sharp, VK4NS, sends along details of slow morse transmissions broadcast by the Royal New Zealand Air Force station ZKY on 3236 kHz and 6885 kHz. On the former frequency MCW is put out at 10 wpm from 21.00-21.15 Z and at 15 wpm from 21.15-21.30 Z. On the latter frequency 5 wpm goes out from 05.15-05.30 Z, 10 wpm from 05.30-05.45 Z and 15 wpm from 05.45-06.00 Z. The Schedules may change after 3rd August. Also, the station broadcasts morse tests for NZART on the first Tuesday of every second month (the next is in August) from 07.00-07.15 Z at 15, 20 and 25 wpm plain language for five minutes at each speed.

History

"Some considerable discussion centred around the possibility of forming an All Australian Wire (less) Institute." Extract from the Minutes of the W.I.A. Federal Executive Council held in Sydney on 16th December, 1943. ●

ZL Counties Award
VK Electorates Award

ALEX SLIGHT, VK2ZA
Bondi Beach N.S.W. 2026

At the May 1972 meeting of the N.S.W. Division of the W.I.A., Alex had the honour of being presented with two awards from the New Zealand C.H.C. Chapter No. 67. The New Zealand Counties Award, for working 100 Counties, and the special award known as the N.Z.C. 112 for successfully working all 112 New Zealand counties. Alex, President of the newly formed C.H.C. Chapter No. 66, tells his story.

After the presentation I was very surprised indeed to find that nobody present seemed to have heard of the awards made available by our goods friends "across the pond", although listening around on the various bands today it appears that a few more VK amateurs are aware of, and trying to obtain, these certificates.

The basic award is comparatively easy to obtain requiring only twenty counties confirmed. Even so, I was surprised to find that my award is registered as VK No. 13. Additional stickers are awarded for 40, 60, 80 and 100 confirmations.

The special award, the N.Z.C. 112, is given when confirmations are held for the whole 112 New Zealand Counties, and I am very proud of the fact that my certificate is the first issued to an Australian amateur (VK No. 1) and is further endorsed as being the second certificate issued to a station outside New Zealand, the first being held by KR6IZ, "Doc" Blasi, who has since returned to Georgia, U.S.A.

A further interesting point is that at the time of issue, the overall number of my award was 24, indicating that only 22 were held within New Zealand. This makes it obvious that the award is not an easy one to obtain, and this should make it a premier and coveted award indeed. In my opinion it is much more difficult to obtain, and an even greater challenge, than the D.X.C.C.

In the first place, for D.X.C.C., we have the possibility of obtaining the required 100 cards from well over 300 countries; but to obtain the N.Z.C. 112 you must work, and receive a Q.S.L. from all 112 counties.

Well, it's "just across the pond". It would appear to be easy, but there are a number of counties in which there are no active amateurs, and in one county at least there are no people resident, and no roads as such, only the odd tracks. In one of the largest counties in the South Island there is only one licenced amateur, who is not very active even though possessing SSB equipment.

So how do you obtain the Award?

Here you get one of the finest lessons and experience of real "ham" spirit and co-operation and it is one of the main reasons why this article was written.

I came across details of the award when applying for the N.Z.A.R.T. Cook Bi-Centenary Award, their Awards Custodian, Jock White, ZL2GX, having included a double sided sheet listing the awards that were available from both the N.Z.A.R.T. and C.H.C. Chapter No. 67. It is a good indication of the hearty co-operation that exists between these two organisations so that ZL2GX is the Awards Custodian for both of them.

The Counties Award — N.Z.C. — intrigued me, and I obtained the necessary and obligatory, checking sheet from ZL2GX for the modest outlay of a couple of I.R.C.'s and an S.A.E. The checking list contains the full list of the 112 counties and the names of some of the principal towns in each. If a request is made to Jock he will doubtless be pleased to forward a sheet showing the awards available from New Zealand.

With the checking list in hand I went through my ZL/ZM QSL cards and found that I had more than enough for the basic award, but I was determined to try for "the whole bit" as modern idiom would put it. I also noted that the majority of N.Z. amateurs have their county printed on their QSL cards.

Then came the start of the greatest experience in friendship, fantastic enthusiasm, and co-operation I have ever experienced in amateur radio and I have been an active amateur with this call-sign for nearly 43 years.

Listening around on 20 metres one evening I came across an obviously American voice calling "CQ CQ New Zealand Counties" from KR6IX". I made contact with him during a lull and exchanged notes on our experiences with the N.Z. stations.

From that time we came on as regularly as possible each evening calling for New Zealand counties and picking up the occasional new one. The "Kiwis" passed the word via the grapevine, and the fortnightly C.H.C. Net, that a couple of overseas amateurs were looking for counties.

Just how it all happened is difficult to remember, but slowly we were joined by Les VK4LZ, who holds the No. 2 N.Z.C. 112 in V.K., Charles VK2AXL, with one very elusive county still required, Muriel VK2AIA, VK2JK, VK3BBV (now VK3APL), VK4VC, VK3SF, VK5QI, VK9RS, and many others. On top of this we were joined regularly at weekends, propagation permitting, by G8JM in London.

From then onwards we received the wonderful assistance I have referred to; fellows who came up on the frequency to pass on information regarding projected mobile or portable operations, news of changes in plans, and offers to go mobile or portable. Many, many such operations were undertaken for our benefit, and I think it fitting to record just some of these operations. I sincerely hope that if I miss the exploits of some of our "Kiwi" friends that they will know that we have not forgotten and never will forget, what they contributed.

Charles Parton, ZL3CP, who went mobile at night on many occasions around the various counties in and around the Christchurch area, as well as going down towards Dunedin to provide two of the more difficult counties. Charles, like the rest of the "Kiwis", very promptly sent a confirming QSL. He also provided an excellent, detailed Government Survey map of both the North and South Islands, at his own expense.

Bert Neilson, ZL2ANA, and X.Y.L. Pearl as log keeper, who journeyed by car and caravan from Otaki to Hokianga county, and others, and then especially altered their route home to provide some of those other counties we needed.

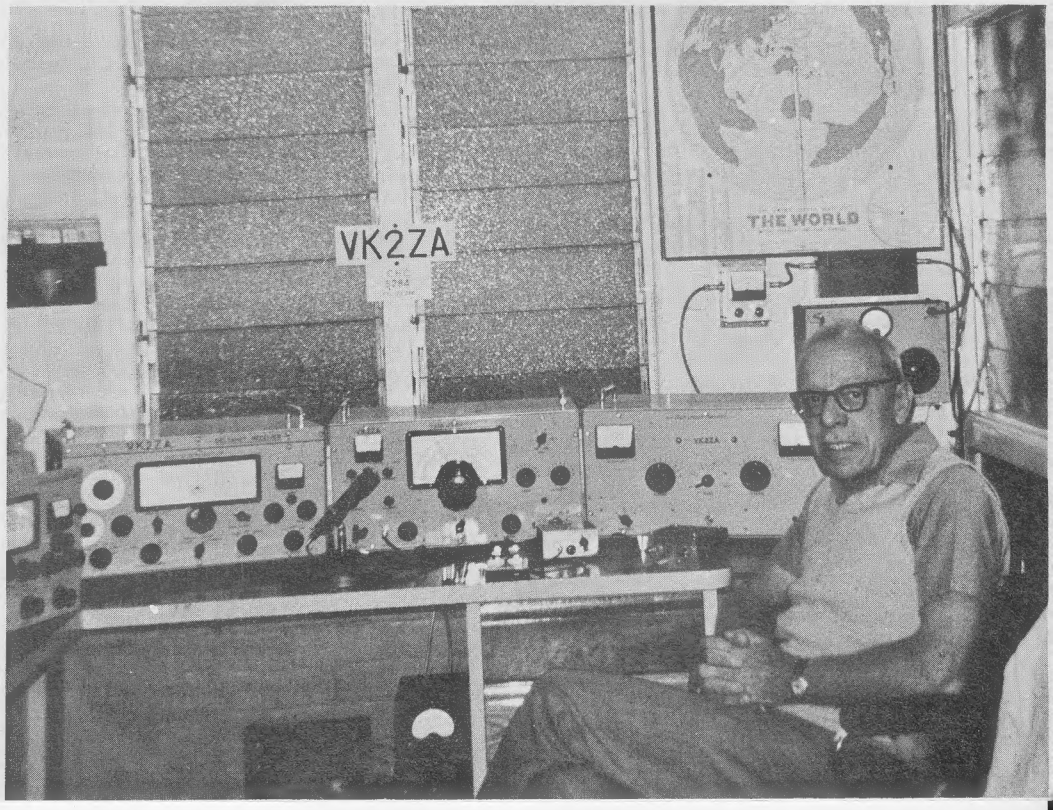
John Luxford ZL2BCX, who went mobile on a number of occasions, but whose crowning effort was a run of some 240 miles after lunch on Sunday, passing through some twelve counties and making some 60 odd contacts with the aid of a second ham as log keeper. He could have made many more contacts but the operation was controlled from V.K. and only those who needed a particular county made contact, the rest refraining from cluttering up the atmosphere.

Ivan Hansen, ZL2OI, George Mayo,ZL3QX, "Casey" Harris, ZL4CA, (first ever to gain the N.Z.C. 112 Award), Joe Hill, ZL2AFH, who, like several others, went to the trouble and expense of booking into a hotel in order to go portable.

ZL2AGB, ZL2AH, and so many others to whom we owe thanks.

I can also remember the happy gent from Christchurch who drove around the narrow, winding, mountain roads inland from that city, at night in a 50 MPH blow, to provide a couple of new counties.

Golden Bay county is one in which there are



no resident hams, and access can only be gained by someone going mobile by road from Motueka or some other town near at hand. Or as was done by Roy Sharland, ZL2LH, who sailed his boat from Nelson to a spot in Golden Bay and was so obviously "having himself a ball" and thoroughly enjoying the job of helping other amateurs.

Then came the time when "Doc" KR6IX, and I only required two counties to complete the score; Fiordland and Steward Island and both a story in themselves.

Fiordland is the county previously mentioned on the south-west corner of the South Island, south of Milford Sound, the latter spot being outside the county, which makes things more difficult. Those who have been in Milford Sound will readily appreciate the type of rugged country concerned. No roads, only bush tracks which require a Land Rover or similar vehicle.

Alan Frame, ZL4GA, from Invercargill, finally solved the problem by going mobile in a four wheel drive vehicle. At the time set down for the venture the group were all checked and waited in suspense for the first sign of life from Fiordland. Then "Casey" ZL4CA came up and advised that he had telephoned Alan's home and received no reply. It therefore seemed that he must be en-route.

At last, to everyone's relief, he came up RS 5-7/8 in Sydney and apologised for keeping us waiting: but who cared about that? Fiordland was in the bag and among those who made contact were G8JM and G4JZ.

We did hear later that the delay was caused whilst looking for a suitable site. The vehicle, and trailer with a 240V Honda alternator on board, were left on the main track while Alan walked into three side tracks looking for a likely spot. It was later reported that having made his choice he backed the trailer and vehicle well over half a mile because there was nowhere to turn and come out. I would personally like to hear more about this effort.

This left "Doc" and myself with one to go — Stewart Island — and on the 15th April '72, Maurie Treweek, ZL4MY, also from Invercargill, flew across to Stewart Island, set up his gear and then had to wait until evening for the local "power supply", all 5kVA of it, to come on.

As an indication of the "spirit" which had built up in the Group, it was tacitly agreed that when Maurie came on the air, "Doc", KR6IK, was to have the honour of being the first to work him, followed by myself. These are the little gentlemanly gestures you never forget, and before the rest took their turns, the air was flooded with "congrats". Then things settled down and away they went.

It is also interesting to note that we were often joined by some of the ZL stations, always hopeful that propagation would be such that they might pick up the odd rare county. They were often rewarded.

I wonder if we have hams like them in this country? I think we do!

The experiences related above have inspired many of those who took part, and others who are at present trying for the N.Z.C. and N.Z. C.II2, with the desire to provide a similar incentive in this country. After a great deal of discussion and solid "spade work", a C.H.C. Chapter No. 66 was inaugurated on 11th May '73 and two awards comparable to the N.Z.C. and N.Z.C.II2 have been instituted.

The awards are based on the 125 Australian Commonwealth Electorates — **The A.C.E. Award** — and while it is appreciated that boundaries may be altered, and new electorates formed, the rules have been so framed that the accepted boundaries for the award are those existing on the Official Maps as at 1st May 1973, and will remain.

It is sincerely hoped that the VK amateurs will enter into the spirit of things as do our ZL cousins; that they will operate mobile or portable in those electorates where there are no licensed operators, or perhaps inactive ones; and that they will be prompt with their QSL cards.

Incidentally, C.H.C. is not an institution which can be joined by paying fees and being a licensed amateur.

Entry can only be gained by a points system which covers such things as grade of licence, morse code speed, membership of a radio society and/or radio club/s. (W.I.A. and so on), awards held (such as D.X.C.C. W.A.C. W.A.S. Cook Bicentenary), active office held in a society or club, technical articles contributed, and many others.

In other words, an intending member must earn his right to membership by showing that he endeavours to participate in a number of phases of ham activity. Under these conditions a licenced amateur, but inactive as far as operating is concerned, may well obtain the necessary 25 points minimum required for full membership.

C.H.C. firmly believes that an amateur should be a member of his national society or institution!

For those who may be interested, and it is hoped that many will be, it is recognised that most amateurs pay dues to a national body such as the W.I.A., (although some cheerfully accept the privileges gained by that body without accepting the responsibility of membership) and consequently fees for entry to C.H.C. and annual dues are kept to an extremely low figure indeed.

If any ham would like further details and information, a letter to myself, or VK3APU, will be very promptly answered.

If you are not certain of your Federal Electorate (your State one will not do!) write to VK3APL (was VK3BBU) if in Victoria, or to myself if in N.S.W., noting particularly that in some cases in metropolitan electorates you may need to indicate on which side of the street you reside. We can even assist you with information on other States.

A letter to VK3APU with 20 cents in stamps will obtain a list of all Commonwealth Electorates and full details of the awards.

Let's see if we can do as well as the "Kiwis". I think we can and should. So here's to happy "Electorate Hunting" and please mark your QSL cards with the name of your Federal Electorate. ●

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50 Golden Years of Broadcasting

THE AMATEUR CONTRIBUTION

G MAXWELL HULL, VK3ZS
Federal Historical Section
Wireless Institute of Australia

This article celebrates the 50th year since Postmaster-General Hon. W.G. Gibson, MHR., formulated the first Regulations governing Broadcasting in Australia.

This action was taken at the insistence of the Broadcasting Companies, the Retail and Wholesale Traders and the Wireless Institute of Australia.

Without such regulatory control chaos was reigning with both commercial and amateur experimenters transmitting at any old time and anywhere on the available wavelengths; without regulatory control the envisaged advantages to peoples all over the world would have been useless.

Amateur experimenters were the only people who understood the 'secrets' of wireless and they were composed of professional engineers, chemists, accountants, salesmen, manufacturers, draughtsmen — in fact from every walk of life came those who participated in this new found science. The electrical and mechanical engineers perhaps had the advantage over some of those from other professions, nevertheless hundreds of people entered the fascinating field of wireless.

This article cannot hope to relate in detail every contribution made by these early experimenters but it is hoped it will serve to revive the knowledge of the part they played in the development of broadcasting in the Commonwealth of Australia.

The Wireless Institute of Australia is proud of its association with the men who played such an historic part in what can only be described as one of the greatest achievements of mankind.

In doing so it extends its congratulations to the Broadcasting Industry on its Golden Anniversary. It is certain the industry has benefitted from the dedication to its work of those amateur transmitting licensees it employs.

An Armistice between warring Nations had been signed on the 11th of November, 1918, and the long, drawn out first world war had come to an end. Great advances had been made in 'wireless' technology during the conflict to the advantage of the Navy, Army and the Australian Flying Corps as it was then known.

The wireless experimenters who went to war, and those who stayed at home, were anxious to recommence where they left off in 1914 but the possibility looked forlorn. At the outbreak of hostilities most transmitting equipment was fitted on board ships and the land based stations belonged to the Maritime Services. For this reason the Navy had taken over control of wireless and was loath to part with this authority. There was much agitation from many quarters for the granting of experimental privileges and various sectors vocalised in opposition to the restrictions imposed by the Department of Navy. These might be summed up in the words of Mr. E.T. Fisk (later to become Sir Ernest Fisk) when speaking to the Australian Aero Club at the Royal Society's Rooms in Sydney in September, 1919 when he said — "The highways of the air for navigation and the highways of the ether for wireless communication should be free to all people in a free and democratic country and no Government department or other body should be permitted to erect barbed wire entanglements about these common airways. All you will require in aviation, as in wireless, are definite rules of the road for using your common highway and some authority to see that these rules are observed". These words of wisdom were spoken so far back and yet are as true today as when uttered.

However, the authority to control radio was invested with F.G. Cresswell — Radio Commander in the Australian Navy — who, on his return from naval operations in the Pacific during the early stages of the 1914-18 war was selected to take over the control, under the Naval Board, of the Wireless Telegraphy Department of the Commonwealth, which had been transferred by Act of Parliament to the control of the Royal Australian Navy. His first work was that of organising the Commonwealth Radio Service on naval lines and under naval discipline.

In 1920 only 21 land stations existed and they were under the control of the Government; there were no private land stations or experimental stations; there were a number of ship stations on Government vessels as well as on vessels privately owned. In the same year Commander Cresswell issued temporary Permits to use Wireless Telegraphy (W/T) apparatus for the purpose of receiving wireless telegraphy signals. The permit was issued pending legislation on the matter of the issue of licences to amateurs and others to conduct experiments in transmitting. Under very special circumstances a transmitting licence could be issued.

This was a bitter pill to the many anxious experimenters who, before the outbreak of war in 1914, had licences granted to them by the Postmaster-General's Department (at that time the authority in wireless matters) to conduct experimental transmissions. But with typical aptitude they set about experimenting with receiving equipment, organising themselves into Clubs and Associations (including the Divisions of the already existing Wireless Institute of Australia) and using every avenue to gain permits for transmitting privileges. Although by 1922 some licences to transmit had been issued, it was not until July of that year that amateur experimenters were successful in obtaining a general licence.

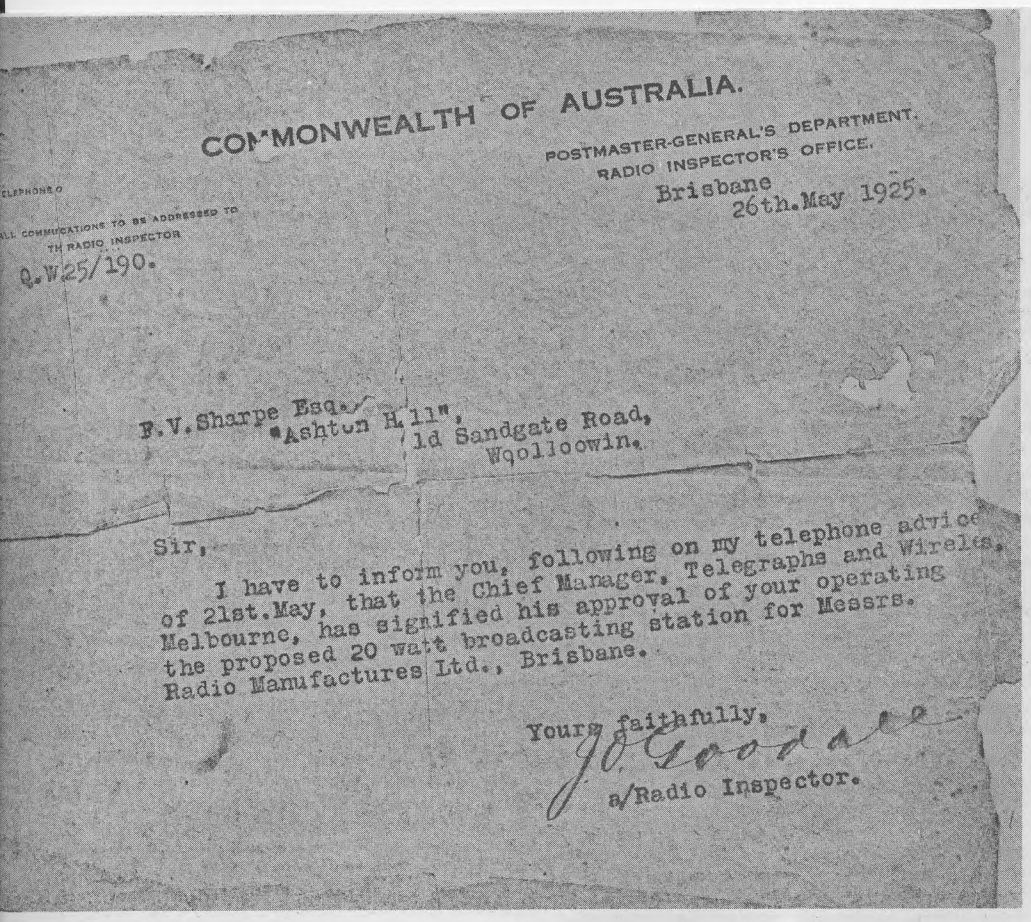
By a concerted action on the part of the W.I.A. and other organisations (including commercial interests) the Prime Minister — Mr. W.H. (Billie) Hughes — was prevailed upon to act in the interests of promoting the tremendous advantages seen in the newly developed science of wireless, experimental facilities for which had been available to overseas experimenters for some time. "The Wireless Weekly" magazine, Volume 1 Number 1, dated 4th August, 1922, carried the good news in which it was stated the Prime Minister had said that facilities granted in other parts of the world would be given to amateurs here under proper control. No restrictions, other than those to prevent interference, would be imposed. One can imagine bells being rung on that occasion!

One of the early licences to transmit was granted to Mr. Chas. Maclurcan of Strathfield. An engineer of some renown (as were many of the early experimenters) Chas. Maclurcan was possibly one of the first to transmit music and 'live' programmes over the Sydney area between 1921-22 on a wavelength (the measure used widely in the early days) of 1400 meters; actually the desirable spectrum territory exploited by commercial interests following the 1914-18 war ranged between 1000 and 30,000 meters with an accepted minimum of around 200 meters. It was following the granting of general licences in 1922 that amateurs were relegated to bands below 200 meters where they set about proving long distance communication a practical proposition. But that is another story to be told on another occasion.

With the announcement of a general licence by Prime Minister Hughes there followed tremendous activity. Experimenters everywhere took out licences, including commercial interests, and, as far as the general public were concerned — broadcasting was born. The experienced engineering amateur soon demonstrated his ability in the newly developing field. His transmissions were logged and reported by the listening enthusiasts. His experiments included the playing of gramophone records (referred to at the time as "canned music") as well as 'live' artists on occasions. He tried out various kinds of aerial systems and read avidly of his transmission reports to assess the coverage. And he developed useful forms of microphone and microphone techniques to improve the quality of his transmissions.

By 1923 there were severe interference problems between transmissions on or adjacent to similar wavelengths; there was an even worse interference problem caused by maladjustment of regenerative receivers causing what were called "Joeys" (said to be peculiarly an Australian expression) between receivers for sometimes miles around; and there were the complaints of amateur transmissions interfering with commercial transmissions. And so by pressure from public organisations, those repre-

GEOFFREY THOMPSON, VK3AC, (then 3GT) experimenting with early transmissions of recorded music when a member of the "Listener-In" technical staff, a publication printed by the Melbourne "Herald & Weekly Times". Geoffrey Thompson conducted these tests under the calls VHM and VHL which were granted to the Company by the Postmaster-General's Department. In addition to carrying out the construction of equipment specially suited for the transmission of news from distant parts directly to the Herald Office in Flinders Street, Melbourne, Mr. Thompson also designed and tested new circuits and wrote two of the first Listener-In Handbooks, the first being—The ALL ELECTRIC RECEIVER in 1929. Some of his other exploits, as those of many other experimenters, will be another story of amateur history to be published in this Magazine.



COMMONWEALTH OF AUSTRALIA.

POSTMASTER-GENERAL'S DEPARTMENT.
RADIO INSPECTOR'S OFFICE.

Brisbane
26th.May 1925.

TELEPHONE 0

ALL COMMUNICATIONS TO BE ADDRESSED TO
THE RADIO INSPECTOR

Q.W.25/190.

F.V.Sharpe Esq.,
"Ashton Hall",
Old Sandgate Road,
Wooloowin.

Sir,

I have to inform you, following on my telephone advice of 21st.May, that the Chief Manager, Telegraphs and Wireless, Melbourne, has signified his approval of your operating the proposed 20 watt broadcasting station for Messrs. Radio Manufactures Ltd., Brisbane.

Yours faithfully,
J.Goodale
a/Radio Inspector.

EARLY BROADCASTING STATION licenses were taken out by private companies but were frequently built and operated by amateur experimenters. This illustration is a permit issued in 1925 by the Postmaster-General's Department giving approval for an amateur licensee to operate the 20-watt (!) station of Radio Manufactures Limited of Brisbane. Mr. Frank V. Sharpe (then 4AZ now relicensed as VK4ZFS after some years' absence from the bands) was one of the amateurs so authorised, and claims to being the first in Australia. Any Contenders?

senting the trade and the professional and amateur experimental people, statutory Regulations Governing Broadcasting were drawn up by the Postmaster-General's Department, having again taken over control from the Naval Department, and these became law on the 1st August, 1923, when announced by the then Postmaster-General, the Hon. W.G. Gibson, MHR. The — "definite rules of the road for using the common highway and some authority to see that the rules were observed" — had come into being; the wise words of E.T. Fisk in 1919 had become necessary.

It heralded an era which was to radically change the way of life in Australia as in other countries all over the world. Its problems have been great but its advancement has been tremendous in overcoming these problems. The amateur experimenter played a vital part in the progress of the Broadcasting Industry.

By 1924 there were probably few licensed amateurs who were not members of the Wireless Institute of Australia or of one of the numberous Clubs and Associations formed for the purpose of extending the knowledge of its members in the exciting field of wireless. The public and commercial enterprise looked to the amateur experimenters for advice and guidance because they were the only people in the community who understood wireless. Almost every publication dealing with the subject was written or edited by amateur experimenters (excluding engineering text books to some degree), and many of these in magazine form were, from time to time, the official organ of the Wireless Institute of Australia which was the largest of the many Associations, being, as it was, represented in every State of the Commonwealth.

The amateur experimenter had trodden a hard road to reach the position of public acceptance achieved by 1924. Because he had been restricted to 'Receiving Permits' only for a number of years he had, by virtue of the restriction, become an expert in receiving and this stood him in good stead when transmitting licences became available.

Through the years from 1924 to 1929 he was in everything to do with wireless. Every newspaper and periodical wrote about the amateur experimenters and their achievements. He was employed by commercial stations (and later the government owned National Broadcasting Service) and experimented with his own wireless station at home in his spare time. He went into manufacture, producing many component parts and producing wireless receivers of improved standards. He even designed and built many of the first broadcasting stations.

His ability was widely made known to the public through his own Club or Association. The Wireless Institute of Australia was in the forefront in its exemplification of the ability of the wireless amateur. The Victorian Division of the Institute organised and conducted the first Wireless and Electrical Exhibition at the Melbourne Town Hall between May 14th and May 19th, 1924, followed by a second exhibition at Wirth's Park (the site of the present Melbourne Cultural Centre) the following year. The W.I.A. — N.S.W. Division — also organised a huge Exhibition in the Sydney Town Hall in 1925. These Exhibitions received the support of most of the commercial manufacturers of wireless receiving sets and component parts. They were in fact 'the hard sell' to the public of the marvels of wireless reception. People flocked to these exhibitions in their thousands.

They were fascinated by the many demonstrations of radio frequency phenomena by amateur experimenters; the reception of music and 'live' broadcasts from both commercial and amateur stations situated remote from the exhibition sites; the ability of some receivers to 'give good loudspeaker strength' of transmissions from other states; and the 'high fidelity' of one transmission compared with another.

These were indeed the golden days of broadcasting. The country was crazy with 'wireless-mania'. It had captured the minds of the populace to the point where unskilled people — young, middle-aged and on-in-years — would have a go at building a crystal receiver so that they could listen-in to broadcast programmes. It rapidly reached the stage in 1925-26 where there were thousands of listeners-in who had paid high prices for their receivers and the reception of broadcast programmes was now a part of living. The listeners became critical of the quality of transmissions when sometimes it was the fault of a not-so-good receiver; they criticised the lack of 'live' artist programmes and the 'canned music' they had to suffer; by 1926 a Listeners' League had been formed whose main contention was that if you owned a radio receiver you owned a slice of the ether and were therefore a shareholder in one of the greatest enterprises of modern times. The League's objective was for better programmes by greater co-operation between listeners and the broadcasting companies. The same period saw the formation of "The Association for Developing Wireless" in Australia, New Zealand & Fiji.

These were perhaps the problem years. Articles appeared stating — inter alia — that not all voices and instruments were suited to broadcasting!

References were made to the poor quality of receivers foisted on the market in some instances. Aerials had been erected by amateurs (this time the literal meaning) and Insurance Companies framed regulations for Victoria under the Fire Underwriters' Association Rules which set down a standard for the safe erection and installation of this part of the listeners' receiving apparatus. The broadcast stations themselves had financial problems. In 1925 the listener licence fee was 35/- ($3.50) and the broadcast station relied on a portion of this fee for its finance. Hundreds of people purchased receivers but didn't pay a fee hence the stations were not receiving the finance required to improve their programmes in accordance with public demand.

But all the time the general standard was slowly improving. Engineers were devising new ideas and new and useful products were appearing on the market. New techniques had been developed overseas and system engineers were able to travel overseas — particularly to America where broadcasting was at a high standard — and return with new ideas for their Company's station. By 1932 many changes had taken place. Old transmitters had been scrapped and modern ones constructed using the latest techniques. Amateur experimenters had kept up with modern trends and in some instances were ahead of the commercial broadcasters, often being praised in the press for the superior quality of their transmissions; a large number of the amateur experimenters had also left the 'broadcast' bands and were steadily pioneering the so called useless 'low wavelength' bands.

There were many notable contributions by Australian amateur experimenters to the broadcasting industry which space does not permit of writing about in detail in this article. Perhaps two of the most outstanding were the Holst brothers. Their own experimental station, 3BY, transmitted an exceptionally high quality signal in its day. When 3DB (Herald & Weekly Times Limited) was rebuilt in 1929 the Holst brothers received the contract to design and construct the new station and for many years it enjoyed what was reported at the time as the station

with the most outstanding modulation quality anywhere in Australia. The Holst brothers were exceptionally fine engineers being the manufacturers of transmitting and audio equipment which was highly respected by the industry. No doubt the reference in the Melbourne "Herald" of August 9th, 1928, wherein the inaugural meeting of the Listeners' League, in calling for a Class "C" station licence for the broadcasting of high class music, would have included the Holst brothers (and many other skilled amateurs) when it suggested that amateur experimenters should make representations to the Government for encouragement with their experiments because in the opinion of the League the broadcasting stations were in their forward position because of the work of distinguished amateurs. The meeting was reminded that the quality of transmission from the high class amateur stations was considerably better than from many of the "A" Class stations.

However, around this time, amateur stations were in peril of being closed down, particularly in the region of 200 meters, because the Government was due to take over these bands as a result of decisions made at the International Radio Conference at Washington, USA, in 1927. The Wireless Institute of Australia had established itself as the governing body of the Australian amateur, having been successful in encouraging most Clubs, Societies and Associations to affiliate with it for the purpose of speaking with one voice. The Administration of the Postmaster-General's Department encouraged this amalgamation of organisations. With this representation the Institute was successful in getting the Government to agree to amateurs continuing to broadcast musical programmes to the listening public on Sunday mornings before "A" and "B" class stations came on the air in the afternoon, and after about 10 p.m. in the evening when the "A" and "B" class stations had closed down. Thousands of people will remember the very excellent programmes transmitted by some of these amateur experimental broadcasts.

This arrangement pertained up to the outbreak of World War II when all amateur stations were compulsorily closed down for the duration for reasons of military security. Following the resumption of amateur transmitting stations in 1947 applications for broadcast band permits were refused. The reason given was that amateur stations in this band were not justifiable whilst the Government was faced with applications for commercial licences from some hundreds of private enterprise companies. And so ended one of the most colorful periods of amateur activity directly involving the public. Amateur experimenters went on to establish themselves in their own right as the real pioneers of the shortwave bands but that is the context of another story.

With the knowledge and expertise which amateur experimenters had given to the broadcasting industry it survived the many problems of its infancy and went on to develop from 13 stations in 1925 (not including amateur broadcasters) to a far flung series of networks in excess of 181 stations in 1973.

1930 brought with it the depression years when the Industry went through difficult financial times. Engineers worked long hours and at times even had their wages cut back. However, there had been interesting technical advances. The electric pickup had been developed in the late 1920's and this dramatically changed the whole concept of transmitting music compared with the old method of placing a microphone in front of an accoustic gramophone. The Amalgamated Wireless Company had commenced manufacturing transmitting valves of a good quality in Australia which stood the Industry in good stead at the end of the 1930 decade when the world was plunged into war for the second time in 20 years and replacement parts were difficult to obtain because of defence requirements. These were the days when transcription discs rotated at 33 r.p.m. and standard discs at 78 r.p.m. and playing needles were so difficult to obtain that some stations retained their own equipment for resharpening old needles. Long playing records might have been in the development stage but as yet hadn't been born. Stereo records had not even been contemplated. Unknown to the industry but just around the corner were wire recorders which revolutionised broadcasting as dramatically as the electric pick-up had done a decade before. The post-war years of the second great world conflict brought these into being along with long playing records. After a short few years of wire recorders the oxide tape recorder came on the scene, a development which brought about particularly high quality recordings and, due to the broadcasting of recorded music, a 'boom' in the record industry. More latterly came stereo recorders and records.

Today the "A" and "B" Class broadcasting stations ("C" Class never eventuated) are now referred to as "National" and "Commercial" stations. Many of the early engineers — including those from the ranks of amateur experimenters — have passed on; some have retired but can vividly recall their experiences in the development of the broadcasting art as though it was yesterday; and a few are still the 'Chief Engineers' of the modern station where only memories remain of the early days of broadcasting.

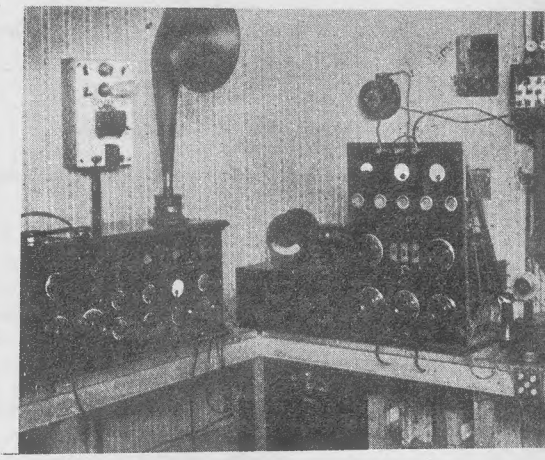
The Broadcasting Industry is certain to enjoy another 50 Golden Years. But will it ever be the same as those first 50 Golden Years? Transmitters, whilst not having changed a great deal in form, utilise components of very reliable quality permitting the equipment to be remotely controlled and generally unattended for other than routine checks. The studio equipment is now mostly solid state incorporating the 'push-button technique' of the 70's.

Perhaps new problems will rear their heads in place of the old ones; perhaps the fun will be in diagnosing — "Which faulty IC caused the breakdown" and replacing it with a solder-sucker without really knowing what was inside it!

But whatever .... the industry today, despite its size, has to bear the fierce competition of television and other entertainment media of this day and age. That it will survive and continue to flourish there seems no doubt. Whilst the Australian Government continues to encourage amateur radio, there is also no doubt that the technological ability of many licensed amateur transmitters will continue to be of service in the broadcasting industry. It is a pity the Postmaster-General's Stamp Advisory Committee did not see fit to accede to the Institute's request for an amateur radio motif to be incorporated in the design of the commemorative postage stamp to be issued in November to celebrate the golden anniversary of broadcasting in Australia. The radio amateur experimenters contribution deserved recognition.

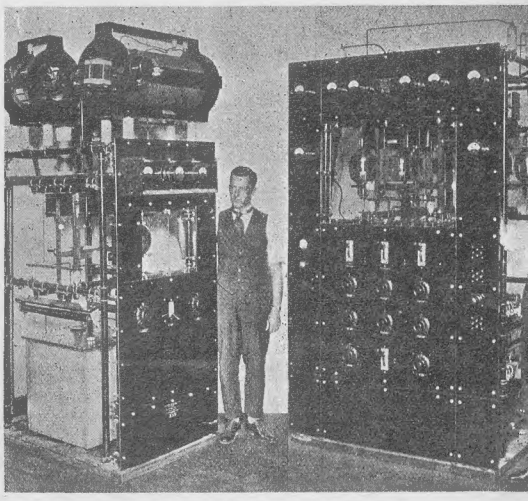
We wish the Broadcasting Industry the continued success it has earned for it has indeed been a magnificent — 50 Golden Years of Broadcasting.

Acknowledgements
Facts and dates for this article were extracted from early technical and semi-technical wireless publications; from early magazines devoted to amateur experimenting and broadcasting; from information kindly supplied to the Wireless Institute from Trevor Evans (VK2NS), Frank Carey (VK2AMI), H. A. Stowe (VK2CX), Arnold Holst (VK3OH), Geoffrey Thompson (VK3AC), P. J. Sebire, (VK3MX), Frank V. Sharpe, (VK4ZFS — previously licensed as 4AZ); from the Divisions of the Wireless Institute of Australia; and from information in cuttings from early issues of the Melbourne "AGE" — "ARGUS" — and "HERALD" newspapers.



THE MELBOURNE "B" CLASS station of 3UZ whose licensee was Oliver J. Nilsen & Co. of Bourke Street. Note the similarity to amateur experimental stations of the day. The transmitter used two 5-watt valves as oscillators and two as modulators and was reported as "delighting enthusiasts in every State of the Commonwealth with its excellent transmissions of entertainment". The year was 1925 when broadcasting was really commencing to 'boom'.

QUEENSLAND was slow to get started when the Broadcasting Regulations were gazetted in 1923, its Government being of the opinion that the State should control wireless transmissions. The first station was therefore built for the Government under the call sign 4QG. The illustration shows the Master Oscillator (left) and the Main Amplifier (Right) of 4QG which was a 5-Kw. station. It commenced transmissions in mid 1925 at a time when arguments were in progress as to whether 'long waves or shorter waves' should be used. Queensland, with a larger area of land to cover than most other States opted for 'shorter waves' and commenced transmissions on 385 meters. It was built by the same manufacturers who designed and constructed 3LO (Melbourne), 2FC (Sydney) and 6WF (Perth).



C.G.S

TYPE C MINIATURE VITREOUS ENAMELLED POWER WIREWOUND RESISTORS

Approved to BS 9114 – N002 style 2E–56

SPECIFICATIONS

The 'C' Series of miniature wirewound, vitreous enamelled resistors has been designed to meet the requirements of Specification BS 9114 - N002, and full Qualification Approval has been granted. A Test Report Summary is available on request; this report shows that many of the performance levels are in fact much higher than the specification acceptance levels.

The use of specially selected materials, combined with the application of exacting quality control throughout all stages of production ensures the consistent achievement of a very high standard of reliability.

ELECTRICAL SPECIFICATION

Tolerance: ±5% is standard on values of 1Ω and above and ±10% between 0.1Ω and 1.0Ω. For non standard values and tolerances please consult the factory.

Resistance values: C Series resistors are available with the preferred ohmic values of the E24 Series within the ranges shown in Table 1.

Temperature coefficient: Typically less than 100 ppm/°C and never exceeding 200 ppm/°C over the category temperature range −55°C to +200°C

MATERIALS

Core: High purity steatite ceramic. Chemically inert, capable of withstanding severe thermal shock and impervious to moisture. Ground to close tolerance finish to give maximum contact with wire element for rapid heat transfer.

Resistance Element: High quality nickel-chrome or nickel-copper alloy depending on resistance value; wound at minimum tension.

End Caps: Formed to close tolerances from a special nickel-iron alloy chosen for its consistent welding properties and glass sealing characteristics.

Leads: Solder coated nickel A.

Uncoated leads can be supplied for welding.

Specify – 'weldable leads'.

Preformed and cropped leads can also be supplied on request.

Coating: Humidity proof vitreous enamel with carefully controlled expansion matched to the materials of the resistor.

TABLE 1

C.G.S.				BS 9114 - N002							STYLE CROSS REFERENCE		
Style	Maximum wattage rating @ 20°C	Resistance Range Ω		BS 9114 - N002 Style	Maximum wattage rating @ 70°C	Approved Resistance Range Ω		Critical Resistance Ω	Limiting Element Voltage. Volts		DEF. 5111-1 Style	DEF 5115-2 Style	G.P.O. Style
		min.	max.			min.	max.		Normal	Low Air Pressure			
C3A	3	0.1	10K	2E-56-2.5	2.5	1	4.7K	3.9K	100	70	RWV3J	RFH3-2.5	P.O.35
C7	7	0.1	27K	2E-56-6	6	1	15K	6.8K	200	140	RWV4J	RFH3-6	P.O.40
C10	10	0.1	68K	2E-56-9	9	1	68K	27K	500	350	RWV4K	RFH3-9	P.O.36
C14	14	0.2	120K	2E-56-12	12	1	100K	47K	750	530	RWV4L	RFH3-12	–

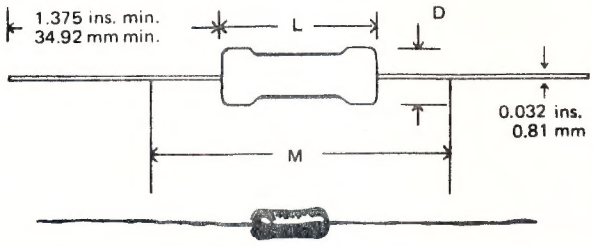


TABLE 2

Style	Length L		Diam. D		Measuring Distance M		Approx. Weight
	max. in.	max. mm.	max. in.	max. mm.	±0.062 in.	±1.59 mm.	grammes
C3A	.499	12.7	0.220	5.6	1.250	31.8	1.0
C7	.874	22.2	0.315	8.0	1.625	41.3	2.0
C10	1.499	38.1	0.315	8.0	2.250	57.2	3.5
C14	2.106	53.5	0.315	8.0	2.875	73.0	5.0

Note: M = resistance measuring points distance – below 10Ω only.

Fixed Capacitors PART 3

C. A. CULLINAN, VK3AXU
6 Adrian Street,
Colac, Vic., 3250

Block Capacitors

In the early days of valve receivers, power was obtained from batteries and HT filtering was unknown. Later "Battery Eliminators" were developed to use the AC mains so that "B" and "C" batteries could be replaced. In some cases, too, rectifiers were available to supplant the "A" battery used for filament supply. In those days valves used directly heated filaments which were their own cathodes. Any attempt to use AC on the filaments resulted in considerable hum being audible so valve manufacturers turned their attentions to improving valve design to make completely AC operated receivers a practicability.

This was achieved through the development of a coated uni-potential cathode. This cathode consists of a coated sleeve into which is inserted a heater, the two being insulated from each other. The heater can use AC to operate at the desired temperature and heat from it heats up the insulated cathode independent, electrically, from the heater most of the hum problems were overcome as far as AC operation of the filament (heater) was concerned

This development opened up the way to manufacture of all AC operated receivers without the need for a filament rectifier system.

In high quality audio-frequency amplifiers using valves it is still a common practice to operate the heaters of valves in early stages with DC from a rectifier and filter to remove every vestige of AC hum that could get into the valve via its heater.

Now in the conversion of AC to DC for plate and bias supplies it is necessary to provide adequate filtering of the current supplied by the rectifier and this filtering calls for large values of capacitances. In the early AC sets a "pi" filter was used with a capacitance of 4 mfds being used in each shunt arm.

Also DC voltages rose above the usual 135 volts supplied by "B" batteries for battery operated receivers thus the filter capacitors had to have better insulation than those used in Eliminators.

Early types of capacitors for HT filters were usually made of two strips of aluminium foil wound between paper strips. Leads were taken from one end of each foil, the whole assembly placed in a straight sided metal container, then the air spaces filled with an insulating medium such as paraffin wax hot poured.

After cooling a top was soldered to the container, with some type of insulated terminals being brought through the top.

Some of these capacitors were made in ratings of 4 mfds and 600 volts DC working.

Because of the manner of connecting the leads to the metal foils these capacitors had a certain amount of inductance.

These capacitors were given the name of Block capacitors or condensers.

Block capacitors are still manufactured, the usual capacitance range being from 0.05 mfd to 4 mfds in voltage ratings of 200, 400, 600 or 1,000 V D.C. Also for some purposes, Block capacitors have been made up to 16 mfds at 100 V. DC

Modern Block capacitors are made with better insulating materials and the terminals are usually brought out through hermetically sealed ceramic insulators.

Some makes use the "Non-inductive" technique of lead termination whilst others use the old fashioned inductive construction.

In some cases it may be necessary to use the "non-inductive" types and it could be a wise precaution to ascertain the inductive nature of a Block capacitor from the manufacturer.

For instance, inductive capacitors can play havoc with equalizers and audio-frequency networks, as well as cause mystifying upsets in by-passing.

For instance an audio-frequency amplifier made to the specifications of "An Outside Broadcast Amplifier" Lecture No. 9 Amateur Radio, November 1970, had excessive distortion at 50 HZ although three other similar amplifiers were free of this problem. The distortion was traced to the screen by-pass capacitor of the first EF86 valve. This capacitor was a Block type which was found to be inductive.

High voltage capacitors for transmitting purposes may be manufactured in the same manner as Block Capacitors but are far larger and are referred to as Transmitting capacitors. One USA made "ham" transmitting filter capacitor of 4 mfds, 4,000V. DC working measures 8" x 3¾" x 4-9/16". In Australia this would not be known as a Block capacitor.

The Electrolytic Capacitor

The development of AC operated radio receivers and Audio frequency amplifiers was paralleled with improved power amplifier valves and better loud-speakers with the electrodynamic type starting to take over from the earlier diaphragm and cone types.

The improved loud-speakers developed better bass response and quickly showed up hum due to inadequate power supply filtering of the rectified AC.

The better equipment would use a two section low-pass filter, the capacitors being at least 4 mfd Block types. However these capacitors were large physically, so took up a lot of space on a chassis. To increase the capacitance of the shunt arms of the power supply filters meant the addition of extra Block capacitors or one or more very large filter reactors.

One imported radio receiver chassis of around 1930 weighed about 50 lbs, most of the weight being in the AC power supply.

In the late 1920's and early 30's Electrolytic Capacitors began to find favour with radio-set designers as filter capacitors in AC power supplies because the electrolytic capacitors offered very large capacitance in relatively small space for voltages up to about 500 volts. For instance an early "wet" electrolytic capacitor of 8 mfds, 500 volts was about 3.5 cm diameter by 11.4cm high.

Certain metals, such as Aluminium, Tantalum and Manganese, to mention a few, can be readily coated with an oxide film about .00063cm thick when subjected to an 'Electrolytic' forming process. Such oxide films possess a high resistance in one direction but very low resistance in the other direction. It is this oxide that forms the dielectric in electrolytic capacitors.

Aluminium is readily available and is cheap and can be obtained with a purity of 99.998% so is ideal for the manufacture of electrolytic capacitors.

Tantalum is another metal which is finding acceptance in place of Aluminium for modern electrolytic capacitors. The forming process consists of immersing an Aluminium Anode in a tank filled with electrolyte and containing a suitable cathode such as Aluminium or stainless steel.

When a positive DC voltage is applied between anode and cathode a critical value is reached at which Aluminium Ions are released from the anode material and combine with electrolytically produced Oxygen Ions to form a thin film of Aluminium Oxide on the surface of the metal.

For any constant voltage above the critical value for Ion movement, the initial current is high then gradually decreases as the oxide film is deposited on the surface of the anode. The process is completed, when the current has decreased to a constant residual value. Thus the thickness of the oxide layer may be controlled accurately by selecting the value of the 'forming' voltage applied.

Early electrolytic capacitors were known as "wet" types as the electrolyte was a liquid generally containing a large quantity of water.

It consisted of a metal container which also holds the liquid electrolyte. Into the container was placed a number of corrugated aluminium plates which we bent into ridges to increase their surface area, and consequently the capacitance of the capacitor.

These aluminium plates were all connected together to form one electrode, the anode, of the capacitor. The electrolyte forms the other electrode, cathode. A flat aluminium plate placed opposite each corrugated plate serves as a means of passing into and from the electrolyte. A film of oil was floated on top of the electrolyte to prevent evaporation and it was usual to have vent holes for safety should the liquid electrolyte expand unduly because of excessive heat. Old timers will recall that sometimes the top would blow out of a wet electrolytic capacitor when overheating occurred so rapidly that the vents could not cope.

Various types of electrolytes will operate in an electrolytic capacitor. To mention two, there is ammonium citrate as one and a solution of borax and boric acid in water as the other. The latter was perhaps the most commonly used, it being non-combustible, non-poisonous, and non-injurious to clothing.

"Wet" electrolytic and "semi-dry" electrolytic capacitors do not appear to be manufactured in 1972 as far as can be determined having been superseded by the "dry" type.

Semi-dry" electrolytic capacitors contain an electrolyte in liquid form having a viscosity between 3 and 4.5.

The electrolytic capacitor has a uni-lateral conduction characteristic, that is, it has an exceedingly high resistance to current flowing in one direction, but a very low resistance to current in the opposite direction.

The voltage which may be impressed across the capacitor before the film constituting the dielectric breaks down and permits an appreciable leakage current is called the CRITICAL VOLTAGE of the capacitor. The voltage which may be impressed on the capacitor safely without danger of rupturing the dielectric film is called the WORKING VOLTAGE. At the present time the maximum working voltage of an electrolytic capacitor is about 500V.

Dry electrolytic capacitors consist of an aluminium foil anode (positive plate) with an oxide film dielectric, which has been pre-formed as described earlier.

Layers of porous paper are saturated with an electrolyte paste and positioned against both faces of the anode.

The electrolyte is the true cathode (negative plate) of the system, however for convenience of electrical connection a second aluminium foil is used as a connecting electrode.

The start of the anode foil is crimped on to a central aluminium pin and a sandwich of anode foil, electrolyte soaked paper and the contacting electrode foil are then interwound about the pin. Tinned copper connecting leads are attached to the pin and the connecting electrode.

The sandwich with its leads is placed in a metal can with an effective insulating seal fitted over the open end of the can.

Because of the electro-chemical nature of the oxide dielectric, the anode must always be maintained at a positive potential relative to the electrolyte cathode. Reverse polarity gives rise to a large electron current through the oxide film which seriously impairs the capacitor.

Consequently care must be taken, always, to ensure that whenever an alternating voltage is superimposed on a direct voltage, the negative peak of the alternating voltage is less than the amplitude of the direct voltage. Additionally, the positive peak of the alternating voltage must not exceed the specified peak working voltage of the capacitor.[9]

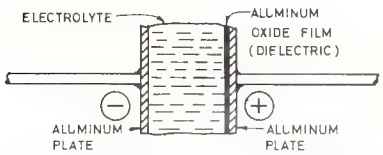


FIG 9 ELEMENTARY ELECTROLYTIC CAPACITOR

Tantalum has taken over from Aluminium in some types of Electrolytic capacitors. These have an extremely small tantalum anode with tantalum oxide film. The electrolyte is a solid semi-conducting material which will neither leak or corrode if the hermetic seal of the outer case becomes broken. These capacitors are extremely rugged, being designed for severe conditions.

Aluminium electrolytic capacitors usually have an operating temperature range from 10°C to about 60°C. with high temperature types going to 85°C. Below 10°C the electrolyte resistance may increase quickly and the capacitor ceases to behave as one. However, there are some types mainly for use in Solid State circuitry having an operating range from – 10°C to 60°C.

Tantalum capacitors are made in a variety of temperature ranges, the extremes appearing to be –80°C to +200°C and with working voltages up to 540V, although this is governed by the temperature. For instance one Tantalum Capacitor is rated at 8 mfds 360V. DC working at +175°C but at 85°C the DC working voltage becomes 540 volts.

Electrolytic capacitors are available in wide ranges of capacitance values, working voltage ratings, physical sizes, single or multiples in the one container and a variety of containers.

Examination of several catalogues would indicate that the lowest value in capacitance of electrolytic capacitors is 1 mfd and the greatest is 100,000 mfds 3.5V DC working.

Series or Parallel Connection of Capacitors

Quite frequently an amateur will find that he doesn't have available a certain value of capacitance called for in a circuit but he does have several capacitors of other values. If he has several, each having less capacitance than that called for, he can connect some of them in parallel to make the desired value remembering that most circuits will call for a tolerance not better than + 5%.

Let us take an example. A circuit calls for a capacitor of 0.066 mfd. This value can be made up of two capacitors of 0.033 mfd each or three capacitors of 0.022 mfd each or from uneven values such as 0.01 mfd. 0.05 mfd, 0.006 mfd. The main precaution to take is to ensure that each capacitor has sufficient voltage rating. Also if being used at Radio-frequencies it is better to use a single capacitor if possible.

Electrolytic capacitors may be added together in parallel to obtain a greater value of capacitance but care must be taken to ensure that the voltage ratings are correct, also that the leakage current is not greater than that of a single capacitor of the correct value should leakage current be important.

Series Connection

Capacitors may be connected in series but the resultant capacitance will be less than the value of the lowest value capacitor.

When capacitors are connected in parallel it is only necessary to add up the various capacitance values by simple addition but when the series connection is used it is necessary to calculate the final value by using a different formula.

For parallel connections:

Total capacitance = A + B + C + D + N where A,B,C,D, and N are the capacitance values of the individual capacitors. For series connection of Capacitors the formula is:

$$C = \frac{1}{\frac{1}{A} + \frac{1}{B} + \frac{1}{C} + \frac{1}{D} + \frac{1}{N}}$$

There are three reasons for connecting capacitors in series.

The first is to obtain an unusual value of capacitance.

The second to obtain a higher voltage rating in say a power supply system.

The third is to make use of existing capacitors rather than buying a new one.

Many amateurs operate transmitters which use HT voltages above the working voltage of electrolytic capacitors and as high voltage high capacitance oil-filled capacitors are expensive the simple method of connecting electrolytic capacitors in series is used. However there are several precautions to be borne in mind.

Firstly, equalizing resistors must be connected across each capacitor. This is to ensure that each of the capacitors in a series string has the same voltage across it. If this is not done most of the voltage may appear across one of the capacitors with its complete destruction as a consequence. Secondly each of the capacitors in the series string must have the same nominal capacitance value and should be of the same working voltage rating.

Approximately 20 years ago the writer made up a transmitter power supply to give 600V. DC at 100 ma for an amateur transmitter and this power supply has never given a moment's trouble in all that time.

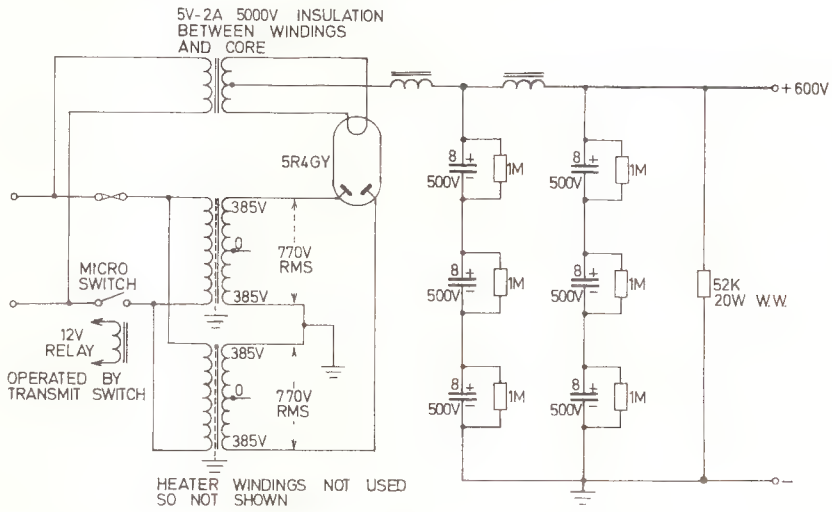
Here are the details.

Two new Trimax power transformers for receivers or amplifiers were bought for $1 each from a radio stores unwanted stock. You can be lucky some times! Each transformer had a 385-0-385 volt secondary at 100 ma. Knowing that these transformers had to pass test voltages of 1,000V. RMS between windings and windings to frame, a simple calculation showed that if the whole secondary of each transformer was used as one half of a fullwave system then the peak voltages should be well inside the manufacturer's test ratings.

By connecting the whole secondary winding of one transformer in series with that of the other and using the junction as a centre-tap then it would be possible to obtain 770-0-770 volts RMS for a full-wave rectifier. The primaries of each transformer had to be connected in parallel and phased so that the two secondaries would not be in opposition. Switching of the HT output was to be done in the common lead to the primaries via a relay operated micro-switch. Due to this method of switching it was not practical to use the heater windings of either transformer. For CW Time-sequence grid block keying has been used, with the HT on until sending was completed.

The 5R4GY rectifier valve obtains its filament supply from its own transformer which has extra high voltage insulation between primary and secondary.

The heaters of the valves in the r.f. portion of the transmitter are supplied from 6.3V wind-



VK3AXU 600V POWER SUPPLY - FIG. 10

ings on a 300V power supply transformer, as are the heaters for a screen grid modulator. A plate modulator has its own power supply.

As the circuit shows there is a two section low-pass filter with choke input, so that the regulation of the power supply is improved. Also it so happens that with the chokes used the DC output voltage is exactly that required, 600V. This was luck! The reactors (chokes) were some 125 ma. types that were on hand.

The circuit reveals that both the capacitive arms of the filter use three 8 mfds 500V. DC working electrolytic capacitors in series, each capacitor being shunted with a 1 megohm 1 watt resistor to obtain proper voltage distribution across each capacitor.

In each arm the effective capacitance is 2.66 mfds and has proved satisfactory for the purposes for which the power supply was made.

Note that there is a 52,000 ohms 20 watt W.W. resistor connected across the output of the filter. This acts as a bleeder resistor for safety, as well as assisting regulation of the power supply.

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Gratitude is again expressed to the above organisations for the extensive use of their information in this series of articles. ●

Y.R.S.
with Bob Guthberlet

Methodist Manse, Kadina, S.A., 5554

Report of the Syllabus Committee.

In coming to its conclusions the committee has tried to anticipate what the P.M.G. may require for the Novice Licence. An important recommendation is that the Senior and Advanced Certificates be eliminated. The State Supervisors will be studying the proposals and will let me know their reactions.

"It was unanimously agreed that there be three study Certificates and that the present Senior and Advanced Certificates be discontinued. It was further agreed that the three new Certificates be called Elementary, Junior and Senior Certificates and that the three Certificates be aimed towards modern electronic trends i.e. Transistors, Integrated Circuits and other Solid State Devices. It was agreed that the study notes be printed as one complete book as the three new syllabi will overlap work covered in each Certificate."

"This committee feels that most electronic requirements are based on Solid State Devices with valves fulfilling operations where transistors cannot fulfil that function. With this in mind the fundamental theory is based on transistor operation. The Committee in determining the content and order in which things will be taught considered modern trends in teaching and teaching aids, the capacity of youth to absorb information, a sequence of events that will create more interest by youth in the Scheme and a syllabus that will be current in five to ten years hence. In determining that 'Transmission' should be dealt with before 'Reception' the committee agreed that in order that a signal can be received it must first be transmitted and it was logical that our syllabus and notes follow along these lines." ●

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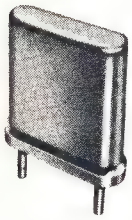

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CQ Oscar 6

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Since the inception of the Oscar Satellite Programme I have always looked forward to the day that a successful active translator would materialise and thus enable a prolonged study of the systems being flown in that particular package. I hasten to add that the study would be on a truly amateur basis, using equipment most likely to be in the possession of the average amateur. The launch of Oscar 6 on October 15, 1972, fulfilled that desire and now, 8 months later, I shall attempt to summarise my findings based on contacts made from this QTH during that period.

PRE-LAUNCH PLANNING

Whilst Oscar 6 was in the design stage, and known as the AOC Package, the specifications were widely publicised in most amateur magazines; satellite parameters were published to enable amateurs like myself to determine their equipment capabilities. For the reception of translated downlink signals on the bandpass 29.450 to 29.550 MHz the prospect of using a trackable azimuth-elevation system on 10 metres was not a practical proposition and a compromise receiving aerial, the turnstile, was selected. On the transmitting side using an uplink of 145.90 to 145.95 MHz. and realising that a theoretical effective radiated power (e.r.p.) of 100 watts was necessary for full acquisition of Oscar 6 at a range of 2000 miles, there were two distinct systems that could be employed.

Firstly there was the fully trackable azimuth-elevation rotator using a beam and low power transmitter to achieve the e.r.p. specification, or secondly the simpler approach of feeding 200 watts output to a 2 metre turnstile antenna to achieve the required 100 watts e.r.p. without the associated tracking problems of the AZ-EL system. Although this latter system had the advantage of easier tracking, we were now committed to one mode only, A3a, Single Sideband, to comply with PMG Licencing regulations. Notwithstanding, the latter system is in use at this QTH and has proved very successful!!

Therefore, by launch day, the following equipment had been assembled for experimentation with Oscar 6.

Receiving:- 10 Metre Turnstile to Drake 2B.

Transmitting:- FT200 exciting HB Transverter including linear amplifier delivering 160 Watts PEP Output to a turnstile. Although this combination provides only 80 watts e.r.p. it has presented no significant disadvantages.

POST LAUNCH OPERATING TECHNIQUE.

Following a series of postponements, word was received in Australia that Oscar 6 had at last been launched into orbit. Then began a familiarisation programme in which a whole new era of operating procedures had to be established to cope with:—

1. Netting onto stations calling CQ via Oscar 6 as the signal slid through the receiver passband due to Doppler shift.
2. Extreme QSB on the received 10 metre signals due to the high spin rate of Oscar 6 until magnetic stabilisation of the package was achieved, and
3. The relatively short "window" of 22 minutes maximum in which QSO's could be made.

Most amateurs soon learnt to adequately cope with these problems and within a very short period extended QSO's between VK and ZL were a reality.

SSB — PRACTICAL OR IMPRACTICAL?

Prior to launch some theorists predicted that SSB would not prove to be a practical mode through Oscar 6 due to Doppler shift. But it was soon realised that SSB, from the practical point of view, was superior to all other modes. Total shift on the 2 metre and 10 metre circuits combined, amounts to approximately $\pm$ 4.5 kHz for the 910 mile circular orbit of Oscar 6 and, although you need to continually tune your receiver to maintain "in pitch" demodulation, especially at the centre point of each pass when the rate of change of doppler shift is maximum, the technique of left hand on the receiver tune, VOX control on the transmitter and logging with the right hand, soon becomes automatic. It is noteworthy to mention that SSB can undergo considerable frequency shift before readability is totally impaired; hence continual receiver tuning is not paramount.

10 METRE PROPOGATION

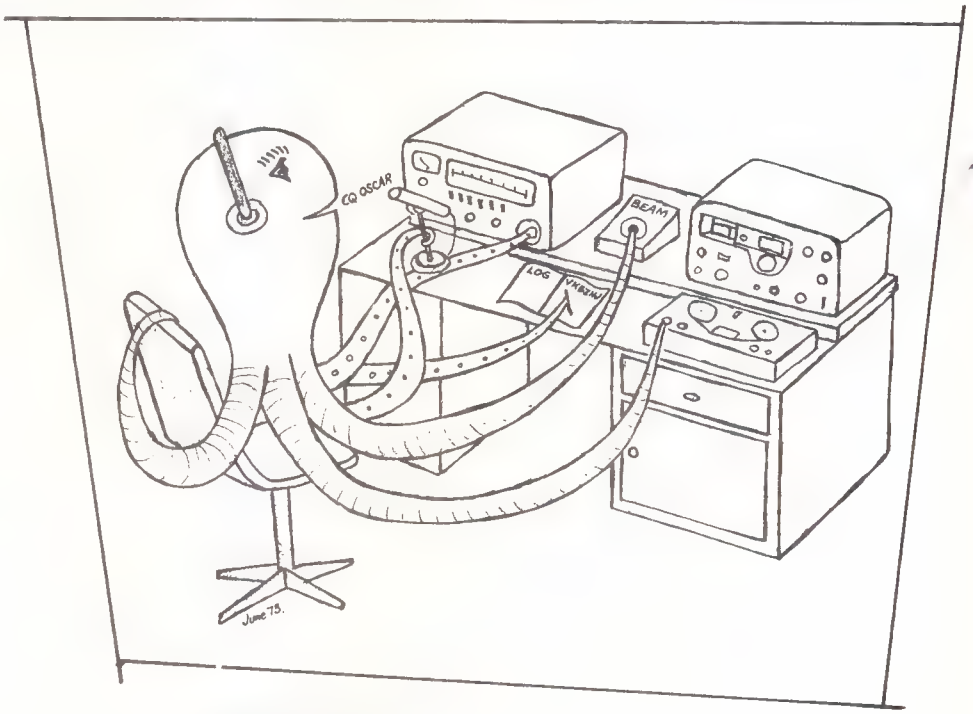
Without doubt the only limiting factor yet encountered with Oscar 6 is the varying propogation of the received 10 metre signals. It had to be expected that this would occur due to continually changing conditions in the tropospheric region. Consequently there have been times that communication ability has been seriously affected. Observations made from this QTH reveal:-

1. Extended 10 metre propogation signals at times audible both prior to and after loss of acquisition for periods up to 10 minutes in duration.
2. Extreme phase distortion at the beginning and end of passes during the VK summer, due to multipath hop through the ionosphere, making SSB readability impossible. CW communication was a marginal proposition under the same conditions.
3. "Staccato Sideband" a phrase originating from this QTH to describe the effect of Scintillation upon the received signals, especially when the rate of scintillation was syllabic. During periods of extreme scintillation, signal attenuations in the order of 20 to 30 db have been noted which make interesting viewing on the receiver S-meter in the fast AVC position.
4. Of late, diversity reception has also been noted. Because of an extremely slow spin rate that is now being introduced into the system due to the relative motion of the earth's magnetic field and the stabilisation magnetic system on board Oscar 6, the 10 metre aerial system on the package is continually rotating producing a horizontal-vertical-horizontal polarisation sequence. However the effect is slight and it requires the previously mentioned propogation effects to be minimal to fully observe this effect. There have been occasions when other oddities have been observed but, due to their irregular nature, they have only been noted for posterity.

PRACTICAL LIMITATIONS

From the outset activity through Oscar 6 was high within VK and ZL. It was interesting to observe the varied equipment in use at the time, ranging from the simple dipole up to the complex azimuth-elevation tracking systems. However, having made the decision to use turnstile antennae on both 10 and 2 Metres (considered to be suitable and, more importantly, within the budget of the average amateur), I faithfully continued to use them.

Over a period of some months it became apparent that the turnstile did appear to be the best compromise when compared to others being used. Notwithstanding, because it is a



"----left hand on the Rx---"

compromise, it does have the limitation that satellite elevations less than 20 degrees above the horizon pass below the main lobe of the antenna. On reception, signals are weaker and on transmitting, although acquisition is always possible, the translated signal is down in strength. This does not present any serious problems except for extreme eastern or western passes.

On an overhead pass an elevation of 20° is usually achieved very early in the pass. Therefore it became apparent that if one wished to work low elevation Oscar 6 passes, with the lure of prospective DX over the natural VHF horizon, additional antennae were required. Consequently, in line with the previous policy of average amateur and budget limitations, a standard half wave dipole was constructed for 10 metres and mounted vertically off the side of my tower. It markedly improved low angle pass reception at this QTH and filled the apparent hole in the turnstile pattern. So much so, that a QSO to DU1 resulted soon after installation.

The transmitting aspect raised the question whether the reliable 10 element yagi mounted 50 foot up on the tower could be successfully utilised without the need to elevate it, and use basic azimuth positioning. The procedure adopted from the outset has proved very successful. This consists of positioning the beam for acquisition and then rotating to the loss of acquisition point in 3 or 4 steps. Invariably you forget to reposition the beam, and lose 2 metre acquisition! The obvious disadvantage is that the higher the maximum elevation attained on an orbit on which you are using the beam without the provision of elevating, the greater will be that period of time in the centre of the pass that non-acquisition will occur. Switching back to the turnstile may well increase available transmission time.

Hence we note that complexity in aerial system switching and station control technique has eventuated and is necessary for these low angle passes. It is at the discretion of the individual operator to deduce what his stations capabilities are and operate within them, or subsequently improve them.

QRZ – PLEASE CALL AGAIN

Despite all the trials and tribulations mentioned to date, we have been most fortunate to have had 374 QSO's up to and including Orbit 3115, all on SSB. Some contacts have been brief and others have included a marathon 15 minute QSO on Orbit 2076 with Don Graham VK6HK. This contact ranks favourably to one on Orbit 1481 with Allan Hennessy VK2RX of 14 minutes duration. On both occasions readability was R5 for most of the time.

As is to be expected, signal strengths vary considerably. On the average signals are S5 to S6. However, on Orbit 1743, the strongest signals ever recorded from Oscar 6 at this location peaked S9. Using SSB, signals peaking slightly above noise in a relatively noise free location, are perfectly readable. An effective noise blanker is an indispensable item on any receiver under low signal conditions, especially over weekends to combat lawn mower ignition QRM.

TELEMETRY DATA

As well as operating through Oscar 6, data logging of the telemetry has been undertaken since the failure of the 435.1 MHz beacon. Although we have had to cope with FM Channel 4 QRM, retrieval of data from the 29.45 MHz beacon has been most satisfactory. Interpretation of the telemetry has at times proved most rewarding and, without it, the success achieved to date with Oscar 6 may not have been fully realised.

FUTURE OSCARS

Oscar 6 to date has been a tremendous success and, with Oscar 7 now being constructed with a package similar to that of Oscar 6 but with a power output of 5 Watts in lieu of 1 Watt, I can assure any amateur interested in satellite communication that successful contacts can be conducted using the average equipment found in most amateur radio shacks today.

Without fear of contradiction I highly recommend the turnstile antenna for 10 metre reception with the possible addition of some form of vertical low angle antenna. For 2 metre transmitting the turnstile is again recommended provided you can obtain the required e.r.p. for acquisition. Failing that I feel that a small, circularly polarised array, permanently elevated to an angle of approximately 20° with motorised rotation azimuthly, would more than suffice. A backup turnstile for directly overhead orbits, irrespective of low transmitter output, would also be advisable to optimise acquisition.

CONCLUSIONS

In this summary of my operations through Oscar 6 I have purposely attempted to restrict the more technical and complex observations that I have documented, in order to convey the belief that operating through an Oscar package is not exclusively for the advanced VHF enthusiast. I make no apologies for this as I honestly consider that a great number of Australian Radio Amateurs have misinterpreted the basic requirements for operation through Oscar 6, and are missing the great opportunity to explore the frontier of space communications. Will I contact you through Oscar 6 or 7 in the foreseeable future?

CQ OSCAR de VK5ZHJ, CQ OSCAR de VK5ZHJ . . . . ●

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The UHF FM Broadcasting Network

Report from John Adcock VK3ACA
P.O. Box 106, Preston, 3072

At the Victorian Division general meeting in June 1973, a lecture was delivered by Mr. J. M. Dixon of the Australian Broadcasting Control Board. The subject, "The UHF FM Broadcasting Network", is of wide general interest and therefore a brief summary is presented here.

First a brief technical explanation. The system in use in FM stereo broadcasting in most parts of the world is the **PILOT CARRIER** system. The signal intended for the left hand speaker is referred to as **A** and that for the right hand speaker as **B.** The base carrier is modulated with A plus B to allow mono receivers to demodulate the signal as mono.

An ultra-sonic signal in turn is modulated with A and B inverted, or A minus B, and this in turn is modulated on the base carrier.

The second carrier is called the pilot carrier or sub-carrier. It appears in the sidebands but when tuned on a mono receiver is inaudible. When demodulated in a stereo receiver, the A plus B and A minus B signals are added and subtracted to produce A and B separately.

And now to the lecture.

The Australian Broadcasting Control Board has to choose a system of UHF broadcasting and there are a large number of systems and factors to be considered. The large variety of systems is mainly brought about by the need for stereo and mono reception, and the many ways it can be modulated.

Experimental VHF FM broadcasting commenced in Australia in 1947, and continued until 1961. In 1957/58 an enquiry recommended its suspension due to an almost total lack of interest. A further enquiry in 1970/71 recommended its re-introduction. VHF FM broadcasting became necessary overseas firstly because of overcrowding in the broadcast band, and secondly because of the demand for better quality. In this country there is some need to ease congestion on the broadcast band. As a result of TV allocations in the international 88 to 108 MHz band, the new services must be UHF. Existing VHF channels cannot be shifted!!

There is no UHF system of broadcasting elsewhere in the world to use as a precedent, so Australia must break new ground. The requirements of the new system are that it should be stereo and possibly quadraphonic, high fidelity, UHF, and capable of being tuned in on a simple receiver as mono. There are three types of listening services to be catered for. Stereo high-fi in the home, stereo or mono in the car, and simple hand held portables. The system chosen will be a compromise between the cost of the receiver and the performance.

The systems to be considered are either FM or pulse. There are three FM systems using pilot tones.

1. The system used in most parts of the world. It consists of broad band frequency modulation with A plus B and an amplitude modulated sub carrier with A minus B which is in turn narrow band frequency modulated on the base carrier. This system was developed for compatability with the existing mono FM system but it is not ideal. It has a higher signal-to-noise ratio on the pilot carrier than the base carrier.
2. As above, but the pilot carrier is broad band frequency modulated on the base carrier.
3. The pilot carrier is broad band frequency modulated by the A minus B signal and the pilot carrier is broad band frequency modulated on the base carrier.

Both the latter systems have a better signal-to-noise ratio but suffer from a higher threshold of improvement. A further FM system being considered consists of two separate FM signals with A and B separately modulated.

There are several pulse systems to be considered. These pulse systems would use time division multiplex and would probably have provision for four channels from the start.

1. Pulse amplitude modulation.
2. Pulse position modulation. Both the above systems have a similar signal-to-noise ratio improvement to FM with the same band width.
3. Pulse Code modulation. This system has the advantage of constant signal-to-noise ratio, as long as the signal is above the threshold of improvement.
4. Delta modulation.

During the discussion some interesting points were made by Mr. Dixon. Receivers for each system are to be supplied by the trade and each system will be tested in the field. The band to be used is the section at present allocated to the broadcasting service above 500 MHz, but some consideration is being given to the band above 470 MHz. The band will be no wider than 40 MHz with a probable 1 MHz spacing between carrier frequencies. It is likely there will be more areas of poor reception on UHF than VHF. Surprisingly, the noise interference at UHF is similar to that at VHF. ●

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Take the hard work out of Coil Winding, use — "WILLIS" AIR-WOUND INDUCTANCES

No.	Dia. Inch	Turns per Inch	L'gth Inch	B. & W. Equiv.	Price
1-08	½	8	3	No. 3002	75c
1-16	½	16	3	No. 3002	75c
2-08	⅝	8	3	No. 3006	88c
2-16	⅝	16	3	No. 3007	88c
3-08	¾	8	3	No. 3010	$1.06
3-16	¾	16	3	No. 3011	$1.06
4-08	1	8	3	No. 3014	$1.19
0-16	1	16	3	No. 3015	$1.19
5-08	1¼	8	4	No. 3018	$1.32
5-16	1¼	16	4	No. 3019	$1.32
8-10	2	10	4	No. 3907	$1.91

Special Antenna All-Band Tuner Inductance
(equivalent to B. & W. No 3907 7 inch)
7" length, 2" diam., 10 turns/inch,
Price $3.30
References. A.R.R.L. Handbook 1961.
"QST," March, 1959.
"Amateur Radio," Dec. 1959

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New **MIDLAND** Products on order for the future **"NOVICE"** Licensees

MIDLAND model 13-869 5 Watt 23-channel crystal controlled, frequency synthesized 27 MHz transceivers, all crystals included, 12 to 13.8 V DC operation, noise limiter, S-Meter, with mobile bracket, dual-conversion receiver, with P.T.T. microphone, all for only $90

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One Watt hand held standard 27-28 MHz walkie-talkies, two channels, model 13-700, each . . $40

One Watt de-luxe walkie-talkies, 27 28 MHz, three channels, battery-meter and extra sensitive receiver, $50 each

Crystals for various 27 MHz channels, also 28 1 to 28.5 MHz, per pair . $3

SWR-Meters, 52 ohm impedance, single meter type, operates as a field strength meter with included pick up whip. $12

SWR-Meters, 52 ohm impedance, double meter type, reads forward and reflected powers simultaneously, $16

P.T.T. hand-held dynamic 50 K ohm impedance **microphones**, sturdy metal case with coiled cord. $10

Large Selection of **HY-GAIN ANTENNAS**

14 AVQ vertical, no guys required, 10 to 40 M 18' tall $45
18 AVT WB vertical, no guys required, 10 to 80 M 23' $65
TH 3 JR 10 15 20 M, 3 el. junior Yagi beam 12' boom $100
TH 3 Mk3 10 15 20 M, 3 el. junior Yagi beam 14' boom $145
TH 6 DXX 10 15 20 M, 6 el. 1 KW Yagi beam 24' boom $175
HY-QUAD 10 15 20 6 element Cubical Quad 8' boom, single feedline . $130
204 BA 20 M, 4 element 1 KW Yagi 26' boom $155
BN-86 Hy-Gain balun, only for buyers of Yagi beams $18
Baluns of local production, excellent finish $15

CDR ANTENNA ROTATORS

AR 22 R . $40
HAM M senior . $130
Both with 230 V AC indicator control units

Large range of 144 148 MHz operation equipment

YAESU MUSEN FT 2 FB 144-148 MHz 10 Watt output FM transceivers, 12 channels with crystals provided for 6 channels, 144.48, 144 60, 145.000, 146,000 and Repeater Channels 1 and 4, 12V DC operation, with mobile bracket and P.T.T. microphone, the lot for only $225

KEN PRODUCTS KP-202 144 148 MHz 2 Watt output hand-held transceivers, with the hottest receiver of the lot, bar none, provision for 6 channels, crystals for 4 channels provided, 144.48, 144.60 plus a choice of channels A or B and Repeaters 1 or 4 . . . . . $150
Extra crystals . . $8 per channel

BELCOM LINER 2 Solid State 144 MHz SSB transceivers, 10 Watt output, 12 V DC operation VXO coverage 144.000 to 144.240 and 144.240 to 144 480 MHz, with clarifier, noise blanker, squelch, mobile bracket and P.T.T. microphone, 27 transistors, 6 FET's one I.C. and 44 diodes, . . . $350

SWAN TV-2C 144 MHz transvertor, 28 MHz input, 240 Watt PEP output on SSB, receiver convertor noise-figure less than 3 db with two FET r.f. stages and FET mixer, 5894 B transmitter output stage, to be powered externally from the supply of the driver transceiver $450

SWAN VHF-150 144 MHz linear amplifier, 150 Watt input on carrier with only 2 Watt drive, built in 240V AC powersupply, with input output relays to by pass linear on reception, optional Class C operation for FM and CW or Class B operation for SSB, twin tetrode RCA 5894-B $375

YAGI ANTENNA 9 elements 144 147 MHz, 9' boom with gamma-match fed radiator, perfect 52 or 75 ohm match, locally produced, complete $30

ON ORDER solid state 144 148 MHz amplifiers, 12 V DC operation, no switching required for use with transceivers, using tuned input and output lines and diodes switching. Also, 144 148 MHz masthead receiver pre-amplifiers, can be left in circuit unhindered on transmission, giving 12 db gain when switched to reception at very low noise figures, 12V DC

POWER OUTPUT METERS

GALAXY RF-550-A 0 400 and 0 4000 W in line meters, with 6 position built in coax switch . $75

SWAN VM-1500, 4 ranges 5 to 1500 Watt rf power in line meter . $50

NOISE BRIDGES OMEGA T antenna noise bridges, 0-100 MHz indispensable for intelligent antenna work, still only . $25
(see E A. July 1973)

YAESU-MUSEN HF SSB TRANSCEIVERS

Four latest models kept in bond storage in Sydney, approximate prices quoted for supply with approved BY LAW (import duties exemption) application, bond-storage and -clearance and -documentation charges which are presently unknown and may vary from case to case, are **extras**

FT 101 . . . $500
FT 200-FP 200 combination . . $325
FT DX 560 . $425
FT DX 401 . . . $475

All prices net, cash with orders basis Springwood, S.T. included in all cases, subject to changes without prior notice, freight, postage & insurance charges are extras!

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Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

Converting BC Receivers to 160

This information is supplied by Harry Heathcote, and will assist the SWL chap who has nothing better than a standard 5 valve SW mantel radio as a receiver.

My favourite band is 160 metres. It may not be known to the SWL, but this band can be covered on the BC set by altering the oscillator trimmer, aerial trimmer and, in extreme cases, the oscillator slug or padder. When operated in conjunction with a simple aerial matching arrangement results are excellent and good reception of the weekly broadcast is assured. Even if you do not have a SW set, you can now receive the 160 metre band, listen to the broadcast, and quite a few amateurs using this band. I suggest this alone will stimulate your interest, and if your knowledge is limited you can always get help from the SWL group.

The following notes will give in more detail the methods of accomplishing this conversion. It is desirable that your set have an RF stage for maximum sensitivity. The first step is to make sure that the set is working well. Alignment of the IF channel is the first requirement. I am assuming that you either have, or can borrow, a signal generator. Connect the signal generator to the aerial of the set and set it to 1860 kHz. The receiver tuning gang should be rotated until it is about 5 to 10 degrees away from minimum capacity. Adjust the trimmers on the oscillator, aerial and RF stage (if fitted) to approximately half capacity.

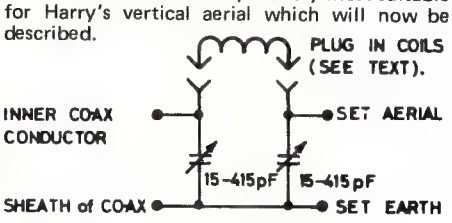
With the signal generator set at full output, adjust the oscillator coil core, or padder if no core is fitted to the coil, until you hear the signal in the receiver. You will be winding the core out of the coil or reducing the capacity of the padder to do this. If you still cannot hear 1860 kHz in your receiver adjust the oscillator trimmer out until you do. In some extreme cases there will not be enough range of adjustment on the coils and it will be necessary to take turns off the tuned windings. This can be messy so if you are stuck this way it might be as well to wind completely new coils to tune the range from about 1500 kHz to 4 MHz, and so get two bands, 160 and 80.

I will assume that the core adjustment brings results. Next, adjust the aerial and RF coil cores for best performance. A snag can develop here; some aerial coils have no cores to adjust. Should this prove to be the case you will have to take turns off the tuned windings. If it is Litz wire, make sure each turn is soldered, otherwise the circuit Q will be reduced. If you have to do this, it may be possible to fit a core after the removal of portion of the winding. This core will then give you some latitude in adjustment. Assuming that each coil has been able to be peaked in 1860 kHz, you retune until you have the tuning gang nearly fully meshed. Adjust the aerial and RF coil cores for best performance on a signal from the signal generator set to whatever frequency the set now tunes to with its gang meshed. The set will not tune the full broadcast band now, so the minimum frequency may be as high as 700 kHz.

Retune to 1860 kHz and adjust the aerial and RF trimmers for best performance, remembering to reduce the output level of the signal generator as the set comes into tune. Other than the initial adjustment the oscillator circuit is not touched again. Go over all these adjustments several times finishing up with the adjustment of the trimmers on 1860 kHz.

Aerial Matching Unit

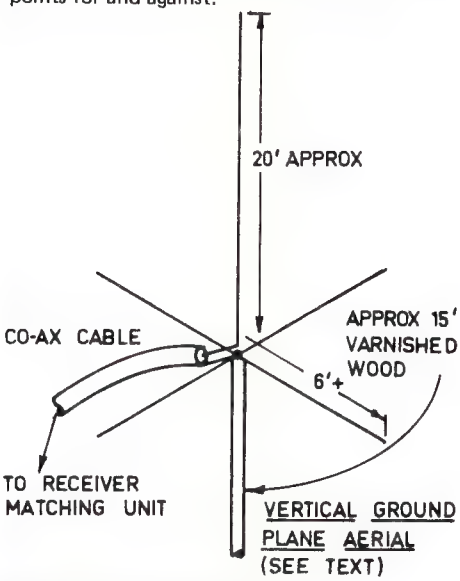
Harry goes on further to describe a simple aerial matching unit. It is in the form of a Pi coupler to match between the coaxial cable and the receiver input. He suggests that plug-in coils would make it easier to tune various bands, and as a starter he found that 12 turns on a 1" diameter former gave good results on 40 metres. No doubt this is probably most suitable for Harry's vertical aerial which will now be described.



AERIAL TUNING UNIT (SEE TEXT)

A Vertical Aerial

Harry writes: "In recent copies of AR there have been some excellent ideas for antennas, but probably space is the major factor in the construction of any aerial. I found that I obtained the best results from a standard SW receiver with a ground plane type, not cut or tuned to any particular frequency, leaving the matching unit to give reasonable Z at desired f. The whole thing is cheap, takes up little space, looks reasonably neat, **and works.** I would like to stress one point. If one is putting up any type of vertical antenna please have a thought for the people behind you and in line with the TV towers. By all means put the aerial up. Then be a good fellow and check. Ghosting can be annoying. Excluding beams this antenna works better than anything else I've tried." This aerial has worked well for Harry but it may not suit your particular needs. I would suggest you consult the various aerial books for other ideas. I commonly use a G5RV as a horizontal and a loaded quarter wave vertical fed against earth as my vertical aerial. Each of these has strong points for and against.



Where to Get Odds and Ends

What sort of wire do you use for an aerial? I use 16 gauge tie wire for horizontal aerials, which costs about ½c per foot. All joins must be soldered, otherwise they soon become corroded and noisy (electrically). For the elements of VHF yagis I use 12 gauge fencing wire, and for the boom I use 1" dowell painted to prevent rot. The supports for these aerials can be TV push up type masts which go to 50 feet or single section galvanised tube 20' x 1½" used with a chimney bracket to give a height, when attached to a chimney, of about 30 feet above the ground. The wire can be obtained at hardware stores and the masts from TV aerial manufacturers and distributors. The old porcelain insulators are hard to come by today but a common source of insulators is from stores that sell electric fences and ancillary equipment.

Many people seem to think that the only place to buy radio equipment or parts is a radio store. This is not the case if you are an improvising home-brew addict. I am not referring to the amber liquid that comes from bottles; One of the main places to look is your local hardware store, particularly if it is a big one. For instance, plumbers' water piping (the plastic type) makes reasonable low frequency coil formers as well as ducts for cables. The galvanised pipe clamps that attach to the facia for toilet vents are suitable also for aerial mast brackets. Galvanised piping saddles are good for attaching masts to fences and walls. ¼" diameter coach bolts make good extension shafts. Small fishing tackle boxes, preferably the plastic ones, make good storage containers for small components. Can you think of other non-radio things that could be of use in radio construction as a cheap but satisfactory equivalent? If so, could you let me know so I can include it in this column. ●

20 Years Ago

with Ron Fisher VK3OM

August 1953.

Amateur Advisory Committees. The Editorial page of the August 1953 issue of Amateur Radio looked into the development of the Advisory Committee from the pre-war Vigilance Committee, and then went into the why's and where-fores of the group at that time. On a later page a full list of the WIA members of the Advisory Committee in each State is printed. A most informative article at that time, and perhaps it's time for an updated version.

The 1953 approach to 144 MHz. hand-held portable operation was described by Jim Bail VK3ABA. The receiver side was handled with a super regenerative detector driving a single audio amplifier which also doubled as the transmitter modulator. A three stage crystal controlled transmitter completed the picture. 1.4 volt tubes were used throughout. No doubt about it, we have come a long way. Just take a look at the new multi-channel hand-held two metre FM units that are available now. Part two of 'Amateur Television' by VK6EC discussed the flying spot scanner, the associated EHT power supply, and the photocell pre-amplifier.

Notes on VHF Converter Design was reprinted from an earlier issue of QST.

A good deal of space in the AR's of that time was taken up with Divisional Notes. Perhaps a look at the reports of the preceding month's meeting might bring back a few memories.

At the June meeting of the VK2 Division, the President Mr. J. Corbin was in the chair and Joe Reed, VK2JR, pointed out the pros and cons of 3.5 MHz versus 144 MHz for field days.

VK3 members enjoyed a 'tender' night with Len Moncur, VK3LN, doing his usual job as auctioneer.

At the Brisbane Meeting Jim, VK4OB, was appointed the new secretary and a lively discussion arose around the subject of incoming QSL cards for non-members.

Dr. Jellenik, Reader in Chemistry at the Adelaide University, entertained the VK5 general meeting with a talk on 'Ultra Sonics and Super Sonics'. The meeting set a record by finishing at 9.30.

In VK7 things were running a bit later; their lecturer did not even show up until 9.15, so a general natter was held until VK7LE arrived to discuss Vacuum Tube Voltmeters. Unfortunately VK6 did not report on their meeting. ●

Afterthoughts

Page 5, JULY 1973, AR

Astute readers will have noted that part of the oscillator circuit of the larger diagram were deleted in the printing process.

Reference to the other circuit will disclose the missing 15K resistors.

AMEND YOUR COPY NOW!

Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

Over the past months, "Commercial Kinks" has included more information on the FT200 than all other amateur journals put together. Although there is still more to come, this month I am going to devote some space to the FT101. With the new Custome Duty situation as applied to transceivers it eems likely that the FT101 will become as popular as the FT200 in the not too distant future.

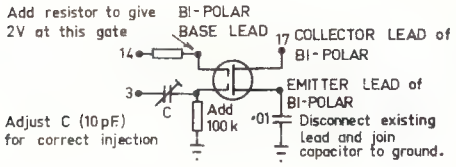
Even though there must be many hundreds of FT101's in Australia at the present time, information on problems and modifications is rather scarce. Perhaps all the present owners are completely satisfied with their sets. Anyhow I have discovered a few good modifications that have been included in the English Mobile News, and with due thanks to the Amateur Radio Mobile Society, present from their September 1972 issue the following modification:—

"The mobile operator has somewhat of an advantage over the fixed station user since usually he will have a high "Q" sharply tuned antenna ahead of the transceiver which will tend to discriminate against out of band signals. Amateurs using multiband dipoles, for example, may find any receiver problems accentuated. G3AZT wonders if anyone has carried out the tests suggested in the RSGB Test Reviews and would like to contact anyone with suitable test equipment. Cyril writes:—

"In the absence of good measurements and based purely upon my listening experience, I propose the following:—

"The Heath SB-303 had good performance when tested by the RSGB reviewers and owners find no problems. The general circuitry and frequencies are similar to the FT-101 but with the addition of an i.f. stage before the crystal filter.

"The f.e.t's are different and the first receiver mixer is a bi-polar device, therefore change the first mixer to an f.e.t. as suggested in the dirgram, fig. 1, also the r.f. stage, receiver second mixer and first i.f. stages. The 40673 f.e.t as used by Heath is preferable for the r.f. stage as it is diode protected. Consequently it is less likely to be ruined when passing close to another mobile or when wiring up.



"VK5PX cleared certain troubles by changing the receiver second mixer to a double balanced mixer I.C. plus a crystal across the tuned circuit. Whilst this probably cleared i.f. signal leakage through the mixer, I am not sure how badly the cross/inter modulation must have deteriorated."

VK-ZL-OCEANIA DX CONTEST 1972 RESULTS

VK — PHONE

Call	80	40	20	15	10	Total
1AOP	525	275	6330	2300	1710	11140
1BC	530	220	3335	3080	905	8070
1GM	..	..	4435	1880	..	6315
2SG	385	1645	11775	5735	2110	21650
2APK	405	2555	8250	5125	3840	20175
2XT	325	1065	8310	5720	1225	16645
2AHK	..	..	8620	..	..	8620
2EB	..	..	7685	..	..	7685
2AOV	..	..	2345	..	..	2345
2WN	..	..	..	110	..	110
3JF	..	..	7555	2300	1415	11270
3SM	..	..	..	2980	..	2980
3BBV	315	..	2535	..	..	2850
3WW	..	..	1050	375	..	1425
3EF	430	110	..	295	55	890
3BDJ	(160 metres only — 230)					230
4VU	..	..	6255	4270	3210	13735
4FH	..	..	1735	4685	4180	10600
4SF	..	..	6435	..	..	6435
4DO	..	..	5425	..	..	5425
4XY	..	..	2500	2335	..	4835
4PJ	210	..	2265	2025	275	4775
4AT	..	..	1085	..	..	1085
4AK						Check
4KX						Check
5HS	470	..	5445	3015	830	9760
5WV	..	..	6055	1165	..	7220
5OR	..	..	2485	1100	765	4350
5NO	..	..	..	3715	..	3715
6TU	255	..	925	1090	..	2270
7GK	365	3630	8340	5760	3410	21505
8CM	..	835	2755	2750	5395	11735
8AZ	..	..	1485	655	..	2140
9RY	..	..	1555	7630	3580	12765
9XW	..	215	3320	265	4320	8030
9XI	..	..	4150	..	..	4150

VK — CW

Call	80	40	20	15	10	Total
1AOP	..	..	2470	1110	..	4020
2APK	675	2580	7285	8230	3040	21810
2AHK	..	..	11585	4140	..	15725
2CX	..	..	5735	7490	1890	15115
2GR	675	2415	8040	2365	1035	14530
2GW	155	1355	6270	5735	..	13515
2BAN	..	..	..	6825	..	6825
2AGI	..	..	5565	..	..	5565
2QL	165	455	339	1935	1750	4635
2BRK	..	3850	..	..	..	3850
2WN	220	55	..	..	..	275
2BQQ•H						7670
3KX	300	2410	5895	6845	1945	17395
3ZT	..	..	8120	5430	1210	14760
3MJ	..	..	..	7250	..	7250
3APN	430	1615	..	..	..	2045
3YK						Check
4KX	..	..	..	6080	..	6080
4XY	..	..	..	3405	..	3405
5NO	..	..	9640	..	..	9640
5FM	..	..	4610	2160	1035	7805
5OR	..	..	2890	1555	..	4445
5UY	..	..	1410	1930	..	3340
6HD	1560	4985	7740	9335	4115	27735
6CH	..	220	4805	1675	..	6700
6CT	1735	..	..	..	..	1735
7GK	1595	5590	7840	3590	2145	20760
7LJ	..	..	4715	735	..	5450
8HA	55	110	2235	6970	1150	10530

VK — SWL

L 2161	5695
L 3377	5940
BERS 195	3920
L 40104	5445

ZL — PHONE

Call	80	40	20	15	10	Total
1BKX	610	1015	9745	7100	3770	22475
1AXB	..	..	13015	..	..	13015
1AMM	165	..	3950	4155	2340	10610
1AKY	55	165	830	5820	3065	9935
1BKR	..	..	9670	..	..	9670
1AIZ	730	1285	1095	4210	1610	8930
1AGO	..	..	..	8685	..	8685
1AMQ		905	3090	920	1760	6775
1MQ	.	..	6045	55	..	6100
1AYV	2175	..	..	..	..	2175
1BHQ	..	1750	.	.		1750
(• 1BKX also 235 on 160)						
2ACP	620	1400	6580	4960	3570	17130
2TG	..	.	6340	3095	825	10260
2AH	..	..	..	7715	..	7715
2GJ	275	670	6090	..	..	7005
2SS	..	110	2970	2335	..	5415
2AWH	2090	..	.	.	..	2090
3US		..	7400	6335	2445	16180
3NS			11210	..	..	11210
4OP			1990	480	975	3445
4BO	..	..	..	..	2340	2340

ZL — CW

Call	80	40	20	15	10	Total
1ARV	..	..	9432	4685	..	14117
1ARV	..	1415	6140	2665	1845	12065
1AMQ	355	2290	4660	1675	2875	11855
1IL	..	..	3805	3980	3425	11210
1AIZ	1400	1685	11505	4160	2380	11130
1AMM	380	1445	1445	3770	2410	9450
1HV	..	2100	3080	2510	580	9395
1BKR	..	..	7130	..	..	7130
1AMO	..	6470	..	..	..	6[illegible]
1MQ	..	..	4175	55	..	[illegible]
1BHQ	.	4070	..	..	..	40[illegible]
2TG	.	1940	5190	2725	4920	14775
2AH	..	..	..	8595	..	8595
2AWH	1200	..	..	..	..	1200
3GQ	220	3765	8610	4565	3085	20245
3IS	..	..	..	5065	..	5065
3CP	..	.	1685	290	..	1975
3ABC	..	..	1865	..	..	1865
4AT	510	640	7120	..	..	9275
4BO	..	4520	..	..	..	4520

OVERSEAS PHONE

EUROPE			
DL8PC	3614	OK1KCP	343
DK3SE	2006	OK1MGW	110
DK8FZ	1995	OK3CFA	18
DK4TA	147	OK1AVD	18
DK3FB	21	OK1NH	Check
DM2AYK	546	OH2BO	9688
EA3JK	70	OH2HN	1404
F9RM	4122	OH2BMG	708
F2QQ	1241	OH6ZH	189
F6BVS	450	OH7NW	75
F6API	168	OH3JR	42
GM8AXY	8	OH2LV	30
G3PHO	3024	OH5PA	18
G3NSY	1885	OH5YF	Check
G3NAS	816	OH6RY	Check
HA4XX	400	OZ6RT	4704
HA5KF	304	OZ7HT	2425
HA6NN	216	OZ1RH	22[illegible]
HA3KNA	42	OZ4PM	[illegible]
HA2KMR	30	OZ7PM	315
HA5KFA	Check	SP3DOI	4056
I3MAU	3159	SP9PT	112
I4LX	3128	SP9AI	75
ON5MG	4424	SP9ABU	40
LA8NC	1005	SP2BBD	18
LA6GF	680	SP1AGE	4
LA5QK	423	SP9BLF	4
LA8RL	186	SP9KRT	4
LA5KO	8	SM7ACB	5478
LA3YQ	Check	SM0AJU	3052
PA0JR	52	SM3BUS	792
OK3YCE	804	SM7ANB	280
OK1ADM	585	SM7BBV	Check
		SM0BDS	Check

ASIA			
JA1ILN	10920	JA3AER	486
JA1CMD	4572	JA3BJN	133
JA1OMH	1391	JA4BNT	5130
JE1NAA	440	JA4BBN	4608
JA1BUI	178	JA4TR	64
JA1AAT	80	JA4DZ	39
JA0CZC/2	7325	JA5FDJ	756
JH2FTH	216	JA5BRL	640
JH2KTY	80	JA5FYK	301
JH2FCA	20	JA4AQR/5	138
JA3MGX	9250	JA5DQH	2
JA3DGC	8382	JA6YCU	15876
JA3LVP	1212	JA6BIF	4380

JH6CAW	1164	9M2CY	370
JA6EFT	1024	JA9BMG	4200
JA7MJ	5670	JA9EQN	990
JA7AQR	4628	JA9BKW	210
JA7CDV	4156	JA0JTO	490
JA7JW	105	JA0JIZ	32
JA8BB	1458	EP2BQ	4209
JA8MWU	1040	XW8EV	132
JA8GO	696	YA1OS	720
JA8AIP	400	9V1RH	1001
JA8DFD	245	9M2CJ	340

NORTH AMERICA

W2FCR	4900	K8VIR	1254
W3TV	5184	W8FJS	156
W3QDR	125	HP1JC	480
W4WSF	14850	XE1LLS	2794
W5SBX	5940	XE2LLX	168
K5LVZ	360	KL7HDX	252
W60XS	1598	VE7VP	6237
W7SFA	22140	VE6MP	2850
WA7PAB	1777	VE3SLC	885
		VE6AYU	50

OCEANIA

KG6JBO	59535	9J2GJ	1264
YJ8BL	54135	VR1AA	40866
KH6IJ	21336	KH6RS	19894

AFRICA

9J2GJ	1264

SOUTH AMERICA

CE8AO	280	LU3HAK	22
SM2AGD/CEO	3211	PY2EZB	18
CP1EU	4283		

U.S.S.R.

UA1CS	2835	UO5BZ	175
UA1MU	16	UI8CD	1530
UA3AAO	13580	UB5WE	3819
UA3VAM	168	UK5LAA	396
UA3DAO	88	UY5OO	203
UV3DN	27	UB5VY	70
UK2GAA	236	UH8AE	1395
UR2QD	837	UH8BO	60
UK2WAF	790	UA9QDX	132
UC2WP	80	UA9MT	114
UK4WAB	1470	UA9CBO	4
UK4WAC	966	UA0MI	1666

S.W.L.

BRS 15822	1444	JA1-8065	256
DM5323/M	176	JA1-12490	27
DM6405/N	132	JA2-1885	1008
HA5-185	50	JH2IRH	96
HE9EVI	1720	JA3-7604	533
LA-M5605	1230	JA3-6362	2
14-15645	2088	JA4-6600	1140
IL-12387	840	JA0-1320	12152
ONL-383	440	UC2-00915	1666
ONL-1090	312	UA1-149-23	1344
OK1-15835	840	UA3-142198	1222
SM5-2735	896	UA3-127-1	504
YO8-8013/SV	—	UA3-142198	440
JA1-11166	9900	UA4-09543	6844
JA111614	5858	UB5-060351	340
JA1-8065	2912	UA6-150-2	272
A1-4876	400	UA0-10316	1728

OVERSEAS — CW

EUROPE

DL8NU	4239	HA2MC	192
DL1JW	4000	HB91K	620
DJ5GG	2080	HB9UD	100
DL1JF	1680	HB0NL	132
DL1JC	598	I3ASE	3014
DM2BJD	3978	I1CRW/P	216
DM4YEL	1649	LA6GF	671
DM2CYO	408	PA0JR	880
DM2BZ		PA0LO	351
	387	OE3AX	132
DM2CHM	300	OK1KOK	4648
DM2DEO	120	OK2QX	2163
DM3UE	78	OK1TA	1602
DM2FBL	55	OK1TS	792
DM3BE	18	OK2PDL	368
DM3XHF	Check	OK1DIM	270
DM4ZEL	Check	OK2BKI	217
EA2AI	360	OK1MGW	210
EA2HR	2	OK2RO	154
F9YZ	330	OK2BKL	72
G2DC	2288	OK2BCI	44
G6XL	690	OK2PAM	40
G3VW	416	OK1MSP	30
G6CJ	Check	OK1EP	18
HA5KBM	9855	OK3CEV	8
HA6NN	460	OK3BT	8
HA4KYB	315	OK2BDE	8
HA5KO	266	OK1AEH	8
OK3TFM	2	SP5GH	8
OK1KZ	2	SP6DMJ	2
OK1AII	Check	SP8AQN	2
OZ7HT	1692	SP9BDQ	2
OZ2X	60	SP2AHD	1
OH2BJY	280	ON4XG	767
OH1OB	210	SM0CCE	1314
OH2LV	72	SM5BPJ	583
OH7SP	65	SM0FY	70
OH2BFX	12	SM0CGO	48
OH5UX	8	SM0BVQ	27
OH2BMG	2	SM7BBV	Check
OH1NW	2	SV0WTT	363
SP9CTW	960	SV0WH	272
SP7ASZ	175	YO8FZ	910
SP3CDQ	108	YU1EXY	1116
SP9DT	108	YU1NGO	477
SP9ABU	70	YU1YE	210
SP2FBC	32	YU2OB	154
SP5EXA	24	YU1ODO	150
SF9EEL	12	YU1SF	18
SP2AVE	8		

ASIA

JA1SJV	9240	JA5DQH	781
JA1ILN	8066	JA4AQR/5	294
JA1NI	7440	JA6MJV	3973
JA1CMD	7332	JA7FS	6747
JH1TGU/1	4160	JA7FC	5684
JA1SR	3612	JA7KXD	2712
JA1BNW	1088	JA7HAF	2346
JA1KNZ	1068	JA7GAX	1840
JA1BSU	574	JA7IKH	1584
JA8BI/1	506	JA7MJ	207
JA1AS	843	JA7JW	80
JR1IIN	261	JA8DIO	1140
JR1PUO	92	JA8AIP	780
JA1UTC	72	JA8GR	490
JH1HMC	24	JA8GSX	110
JA2WK	1452	JA8LOK	70
JA2DNA	530	JA9CAF	6634
JA3YAW	6510	JA9BMG	3380
JA3JRI	1221	JA9EQN	207
JH3SOP	154	JA0AJH	1350
JH3FOR	95	JA0EPV	649
JA3YEJ	80	JA0EZP	516
JA3NXC	48	JA0KSK	70
JH3BJN	2	EP2BQ	2925
JA4BNT	5544	HM1AQ	1476
JA4DZ	91	KR6RU	1092
JA5XX	3072	XW8EV	5

NORTH AMERICA

W1EVT	8778	W6TZD	7100
W2LWI	6006	WA6JVD	6208
W8CQN/2	2325	W60XS	2200
W3TV	2832	K6RU	1092
W3QR	184	W7IR	15980
K4RDU	892	HP1AC	224
W4HOS	492	HR1AT	880
W4JUK	130	VE7HQ	714
W5OB	1650	VE3CDK	25

OCEANIA

VR1AA	29302	KG6JAR	6690
C21TL	2670	KH6RS	19188
KX6BB	7602	KH6IJ	7619
KX6JS	742	KH6GJY	5117

SOUTH AMERICA

OA4AHA	344
LU3HAK	57

U.S.S.R.

UA1DZ	4704	UK5EAG	564
UA1AAA	3775	UB5NS	520
UK1WAB	6	UK5LAA	280
UA1DX	Check	UT5HP	210
UA3AAO	8330	UY5OO	192
UK3YAB	4185	UB5IF	192
UW3HV	3425	UY5TH	48
UA3TAM	90	UB5QAP	Check
UA3GP	24	UK5VAA	Check
UW3YS	Check	UY5GG	Check
UA3DBG	Check	UA6LO	948
UK4WAC	2583	UD6CN	396
UK4WAB	1445	UK6DAU	275
UK4LAD	280	UF6QAC	12
UK2WAF	600	UK7GAA	2040
UK2PAF	4455	UL7GW	864
UC2WP	3	UL7CT	560
UK2PAR	1353	UL7CH	450
UK2GAY	1717	UL7GP	Check
UK2GAA	1292	UH8AE	2380
UK2GBY	196	UH8BO	144
UK2GCG	95	UW9PT	3476
UB5VY	1768	UA9NN	2358
UB5UAL	1508	UW9WL	2196
UK5WBG	1296	UK9MAA	1957
UK9HAC	864	UA0DV	1365
UA9CAL	66	UA0CBR	603
UA9MK	32	UA0CAV	360
UA0JAD	5564	UA0LU	133
UA0MI	2975	UA0TD	39
UV0EK	1674	UA0LEX	21

It was the pleasure of N.Z.A.R.T. to organise the 1972 VK/ZL/O DX Contest and while the number of logs received was a disappointment, it is recognised that conditions were not very encouraging. In spite of this, it is evident from some of the scores that dedicated operators utilising their many talents are able to cope very well under adverse conditions..
Full results are being mailed to all certificate winners and we trust that publicity with local results will be given by the Societies concerned. Remember — the 1973 Contest will be organised by WIA — N.Z.A.R.T. will welcome you again in 1974. Good DXing and 73 from N.Z.A.R.T.
JOCK WHITE, ZL2GX, Contest & Awards Manager.

(In all the recent changes affecting AR, the results of this contest were mislaid. We apologise for the delay in publication. — ED.)

Awards Column
with Geoff Wilson VK3AMK

D.X.C.C.

PHONE

VK6RU	318/347	VK2APK	301/311
VK5MS	316/343	VK5AB	294/314
VK4KS	315/332	VK4PX	293/297
VK3AHO	307/326	VK4UC	291/293
VK6MK	305/329	VK4FJ	286/310
VK4VX	302/305	VK4TY	282/288

Amendments: VK4SD 127/130 VK3TG 201/206
VK3JF 228/230 VK4DO 247/261
VK2AHH 268/280

C.W.

VK3AHQ	306/326	VK3NC	271/297
VK2QL	302/328	VK6RU	265/291
VK3YL	293/313	VK3YD	261/281
VK2APK	292/302	VK4VX	261/263
VK4FJ	291/320	VK4TY	256/272
VK3XB	283/300	VK3TL	251/260

Amendments: VK2AHH 140/150 VK4DO 199/218
VK3JF 202/210

OPEN

VK6RU	318/345	VK4VX	308/311
VK4SD	317/335	VK6MK	305/329
VK4KS	316/337	VK4TY	303/321
VK2VN	313/335	VK2SG	302/309
VK2APK	310/325	VK4FJ	300/329
VK2EO	309/325	VK4PX	300/308

New Member: Cert. No. 149, Call VK3AXQ, Total 109/110

Amendments: VK3QV 144/145 VK4DO 258/279
VK3JF 259/268 VK2AHH 276/292

W.A.V.K.C.A. AWARD

The following additional stations have qualified for the award since 30th June, 1972:

Cert. No.	Callsign	Cert. No.	Callsign
530	JA1FNZ	551	ZL3VJ
531	JA8BZL	552	XE1J
532	SM0PX	553	JA1ILN
533	W0CDC	554	JA7BVA
534	ZM3SX	555	F9OW
535	RA3ACQ	556	G3JFC
536	UA9HM	557	OH2QQ
537	UW0IX	558	I1WT
538	UK5MAG	559	ZL4NH
539	UA0NM	560	4S7DA
540	UK0CAS	561	ZE6JL
541	UK0CAE	562	JA2ACC
542	UW0FP	563	UA1IG
543	JA2AHR	564	UA6LAH
544	JA4BEX	565	JA7MJ
545	XE1LLS	566	DM2BJD
546	JA1FNA	567	ZL2NP
547	JA7HZ	568	G3JEQ
548	UM8FM	569	JA8AIP
549	UK4WAB	570	JA1CKE
550	UQ2GW		

VHF UHF
an expanding world
with Eric Jamieson VK5LP

Forreston, S.A., 5233
Times: GMT

AMATEUR BAND BEACONS

VKO	52.160	VKOWI, Macquarie Island.
VKO	53.100	VKOMA, Mawson.
VK2	52.450	VK2WI, Dural.
VK3	144.700	VK3RTG, Vermont.
VK4	52.600	VK4WI/2, Townsville.
VK4	144.400	VK4WI/1, Mt. Mowbullan.
VK5	53.000	VK5VF, Mt. Lofty.
VK5	144.800	VK5VF, Mt. Lofty
VK6	52.006	VK6VF (VK6RTV), Bickley.
VK6	52.900	VK6RTT, Carnarvon.
VK6	144.500	VK6RTW, Albany.
VK6	145.000	VK6VF (VK6RTV), Bickley.
VK7	144.900	VK7RTX, Devonport.
VK8	52.200	VK8VF, Darwin.

A letter to hand from Peter VK7PF advises his appointment as VHF Officer for VK7 and he starts the ball rolling with advice that the VK7 beacon located at Devonport was off the air at time of writing (27-6), for identification change to VK7RTX, and re-location due to a change of job of the North West Zone Member who looked after the beacon at the 7AD broadcasting station site. The beacon is included in the current list above under the new call sign as it may well be in operation again by the time you read these notes.

Peter further advises that nine VK7's have used the AO6 satellite and worked all States except VK8, plus ZL's. VK7PF has worked KH6HK (3800 miles), has heard DU1POL several times, and has now logged 98 call signs through the translator. Good work Peter, and I will be pleased to hear from you whenever you can write.

Roy, VK6ZFL Secretary of the Carnarvon Amateur Radio Club in N.W. Western Australia, writes with advice that they have completed changes to the keyer of their beacon which now uses the call-sign of VK6RTT. The old call sign VK6TS has been retained as the local Club call.

Roy advises that there have been interruptions to the continuous operation of their beacon during VHF tracking periods, and in particular the Skylab missions, as the telemetery pre-amps are very prone to intermodulation. To overcome such problems the Club is hoping to move the beacon to the QTH of John VK6DR where it should be possible to revert to continuous operation. The life of the beacon and the Club is dependent upon the further operation of the Carnarvon Tracking Station, and we all hope this period may be extended for some time yet. Thanks for the news Roy, always pleased to hear from you. Good luck with the JA's which you work from time to time.

2304 MHz DISTANCE RECORD EXTENDED

Some news which did not arrive at my desk direct, but through the medium of "6 UP" from VK2, and is worthy of mention is the extension of the 2304 MHz distance record from 53.5 miles (refer June A.R.) to 100.5 miles, again by the old firm of VK2BDN and VK2ZAC. The details from page 17 of "6 UP" . . . "On the weekend of 19th and 20th May, Dick VK2BDN travelled to Mt Gibraltar at Bowral (2830 feet) and Bill VK2ZAC to Mt Kulmura (1180 feet). Contact was established between the two stations and signal reports of 5-8 were exchanged, the contact being maintained for one hour . Equipment used was the same as for the contact reported last month. Note that this path is not an optical one, the earth's curvature obscuring it." Further congratulations gentlemen; we all look forward to news of your contacts.

432 MHz ATV RECORD.

It is officially confirmed that the Australian 432 MHz A.T.V. record on file is for a distance of 256.594 miles between VK3ZPA-T in Sunbury and VK7EM-T in Penguin on 13th December 1972. Congratulations to both stations but with the ever-increasing interest in ATV on VHF-UHF it may not be too long before this is bettered.

NORTH QUEENSLAND NEWS.

Ron VK4ZLC, the Publicity Officer for the Townsville Amateur Radio Club has written advising plenty of openings on 6 metres to JA, with VK4RO, VK4ZTK and VK4ZLC taking the main share. Looks like several more additional 6 metre operators from Townsville for the next DX season too.

Channel B is gaining in popularity in the North too, with Ross VK4RO generating 45 watts. Dave VK4ZLZ converting equipment, others constructing beams. Guess all this activity will help on the occasion of the North Queensland Convention for sorting out lost cars etc.

My thanks also to Ron for the copy of "Back Scatter" with news from Townsville. Will be pleased to receive copies as available.

RETURN TO TWO.

The Geelong Amateur Radio and TV Club sponsorship of the "Return to Two" campaign is proving very successful, and many copies of the requested information have been returned to the Club. It is noted in "Q.R.M." from Northern Tasmania that they are lending their support to the campaign, and Geelong is making Wednesday night a 2 metres activities night, so people in other areas might well follow suit, and some good contacts could result.

FT200 AND HIGH POWER VHF SSB.

As there are many FT200 transceivers acting as SSB generators for VHF transverters, the following modifications may be worth keeping in mind if you are having any trouble with your equipment. The brief article is reprinted from the Geelong Amateur Radio & TV Club News letter under the pen of Ken, VK3ZNJ, and I quote:-

"When I built up my Transverter for 2mx I found that with the low power of 10w pep I was not getting enough contacts so I decided to build up a linear to give me a louder signal on the band. So after several weeks the "Loudenboomer" was ready to go and in tests into the power meter it gave well over 75w RMS out and it was time to put it to air. After several QSO's the reports were the same "loud and lousy" so I had a listen to my own signal and it was' . . . back to the drawing board.

"I rebuilt the linear and transverter twice but the result was the same so it did not seem to be the homebrew rigs, and to make sure I took my FT200 round to 3ASQ, and the same result was experienced using his transverter. After thinking about the problem and listening to the signal I decided the problem was RF feedback and with a printed circuit board too!

"However, looking at the map I noticed that the heaters were not bypassed, so I installed a .001 to earth on the 12AX7 mike pre-amp heaters and a .001 across the 10uF bypass on the cathode of the second half of the same tube, as the 10uF doesn't pass RF too well. Well, the rest is history. With 150w PEP out now I was lucky to work VK2NN, and the rig is receiving good reports all round after three months of frustration!" End of quotation. The above may save somebody a lot of work.

TWO METRES.

Last month I commented on the 2 metre activity between Sydney and Victoria, and points between, with various attempts being made for two way contacts. The month of May provided some very high pressure ridges which extended from VK5, across Victoria into the southern areas of N.S.W. Particularly outstanding was the contact between Tony VK5ZDY at Stirling near Mt Lofty, to VK2BDT about 90 miles SW of Sydney, on 20.5.

Another good opening occurred on 11.5. with excellent signals between VK2NN at Wentworth Falls to VK3AJN at Wangaratta, and Ken VK3ZNJ at Geelong. Further north, VK2ZAY at Boggabri was hearing VK3AJN and VK2ZEO, Deniliquin.

Canberra also comes into the news with Reg VK1MP being well received in Sydney, using 3 watts PEP, on 27th. Believe Eddie VK1VP has also been able to take a share of the Sydney path for a change. Following up these efforts the next night saw the following stations being worked in Sydney, VK3AJN, VK3ANP, VK3APF, VK2ZEO, VK2ZAA (Tumut). Thanks "6 UP" for the info.

The signal path from Sydney to VK3 has often been considered a poor one, and probably generally is, but the late tropo openings in May this year show what can be done if you are set up for the job. Seems a pity only four Sydney stations were on to take advantage of such excellent conditions.

6 UP STATE OF THE ART CONTEST.

Although the "6 UP" Magazine State of the Art Contest will probably be over by the time you read this, you are reminded to send your entries and logs to reach the Editor 6UP 47 Ballast Pt. Road, Birchgrove, 2041, by 14th September. This column hopes the contest will be a successful one, and a warm-up for the Remembrance Day Contest to follow shortly after — how about the VHF types getting on the air again this year and indicating their support for the RD Contest.

GENERAL NEWS.

Congratulations to the South East Radio Group at Mt Gambier S.A. for a successful 9th Convention over the June holiday weekend. Despite changes to planning due to the holiday in Victoria being one week earlier than VK5, everything appeared to go smoothly, and I for one had a very good time. The excellent prizes were shared among many, although I did note Bevan VK5TV coming up to the rostrum quite a few times. "The Voice in the Hills" was this year invited to present the various trophies to the winners, which he did dressed in clothes most suited for hidden transmitter hunts — no warning to allow a change to tails and bow tie!

That will have to do for now. Off the air at present whilst the new shack is being built. It will be much warmer than the old one and maybe Bob Murphy VK5-ZDX will stop complaining when next he visits me! Consequently, on-air activity is rather limited.

Closing with two thoughts for the month: Firstly, isn't it nice to read some VHF without being thrashed with news of the current F:M "debacle" . . . and secondly: "Politicians are like ships: Noisiest when lost in a fog!"

The Voice in the Hills

Intruder Watch
with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

A report from the International Amateur Radio Union Monitoring System is interesting and reads:- "The situation on 40mx remains fairly static with the Radio Peking transmissions being heard world-wide. Although the Chinese Administration has acceded to the International Telecommunication Convention 1965, they have made reservations regarding the assignment and utilization of frequencies. It is hoped that a solution will be eventually found to this problem, but probably only in the long term.

Both 20mx and 15mx show a slight increase in the number of intruders listed. On 20mx the activity in the Middle East of a number of SSB stations is causing concern. Although some of these stations use amateur callsigns, the traffic passed includes diplomatic and para-military messages. One station has been identified as being located in Kuwait and another in Morocco. On the high end of the band a Moroccan CW net is also causing some problems. On 15mx there are still a number of diplomatic stations of unidentified origins. Although information regarding the location and controlling administrations of these stations is still being collected, more information would be very welcome.

Out of a total of 41 intruders on the 10mx band, at least 27 are known to be harmonics. It can be seen that if adequate harmonic suppression was carried out the 10mx band would be comparatively free from intruders. The national societies in the countries concerned have been asked to bring pressure, where possible, on the administrations in charge of the broadcasting stations. RSGB headquarters station GB2IW is again operational and stations are invited to arrange skeds."

Thus it can be seen that the RSGB in Great Britain is active in identifying and reporting intruders, and it is only by so doing that we in Australia can play our part. I have sent a summary of intruders heard in this area for the past six months to the UK. Please note that the I.W. Sked or net is operating on 3585 Khz on the second Monday of each month at 0930 GMT.

The VK4 Co-ordinator operates a net for Queensland Members on a frequency of 3580 Khz on the first Monday evening of each month at 0930 GMT. Not as specified in June issue.

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638 Brisbane, Qld., 4001.

1973 JOHN MOYLE MEMORIAL NATIONAL FIELD DAY RESULTS

24 HOUR DIVISION

Section (a). Tx. Phone
VK3YAP 440
VK3AVJ 393
VK4IE 1779
VK4AL 1161
VK4XZ 745
VK5LM 278
Section (b). Tx. CW.nil.
Section (c). Tx. Open.
VK3BMD 1465
VK3AUG 1251
VK3EZ 638
Section (d). Tx. Multiple Operation.
VK1ACA 3038-7 Ops.
VK1JC 2330-7 Ops.
VK2WG 1753-7 Ops.
VK3ATO 3810-11 Ops.
VK3APC 3131-10 Ops.
VK3ANR 1774-8 Ops.
VK3AWS 1620-
VK3YQ 650-3 Ops.
VK4TC 2532-10 Ops.
VK4BW 936-3 Ops.
VK4JI 897-5 Ops.
VK5LZ 1891-7 Ops.
VK5AW 1678-6 Ops.
VK6II 670-8 Ops.
VK8DA 2254-9 Ops.
Section (e) Tx. Mobile.
VK3OR 608
VK4OW 74
VK5LM 278
Section (f) Tx. Fixed Station
VK2VM 335
VK3XB 1130
VK3AYL 660
VK3RN 600
VK3LJ Check
VK4VX 560
VK5NO 1625
VK5LM 279
Section (g) Receiving
W. Newport 1420 D. Vale 1380 L. Smith 1135 T. Hambling 750 E. Trebilcock 260 (all CW)

6 HOUR DIVISION

Sktion (a). Tx. Phone
VK3BBC 737
VK3AKJ 668
VK3AHG 618
VK3EF 583
VK3AAM 476
VK3HE Check
VK4GT 644
VK4ZML 182
VK7BM 285
VK7AX 165
Section (c). Tx. Open.
VK3AVP/T940
Section (d). Tx. Multi Operation
VK3CEC 663-3 Ops.
VK4PJ 419-3 Ops.
Section (e). Tx. Mobile
VK1GM 437
VK3BCF 550
VK3LC 186
VK3ZIM 146
VK4ZTL 91
VK4PJ 15
Sction (f). Tx. Fixed Station.
VK3KK 375
VK3HE 235
VK3WP 165
VK3PR 130
VK7AL 225
Section (g) Receiving.
J. H. Zinkler 1525
M. O'Connor 1395 S. Dwight 1110
T. Hannaford 775
R. Everett 425.

You will no doubt be pleased with the greater interest shown this year. Comparing with last year's results you will find that we have made a 20%+ improvement ... it needed but 15 logs to do that. I doubt that overseas publicity helped much so, with ZL and other Oceania help, we must generate our own activity.

The cry is always that contestants are not kept active enough but we are heading for a really active Field Day.

If you were not in this year's contest make sure that you are in next year ... preferably portable. We do not have enough operators who can transmit without mains power.

Who can forward a constructional article on a Homebuilt IC generator outfit, suitable for our Field Day?

It is good to see the list of multi-op stations. These consider, without detracting from the more valiant efforts of the single-op stations, bring a team spirit into the contest. Some will comment "Look at all the operators they had?" But it takes some co-operative effort to get a large number into the field for 24 hours

Thanks to the fixed stations who helped out.

Are you happy about the 6 hour and 24 hour Divisions??

It appears that we are catering for quite a range of operating requirements.

Thanks for the comments, which I will correct for next year Any photos for "A.R."?

European DX Contest

CW: August 11th and 12th. 0000GMT Saturday to 2400 GMT Sunday.
Phone: September 8th and 9th.

Single operator and multiple operator.
36 hours of 48 by single op., 12 hour rest in up to 3 periods.
Usual RS/RST exchange. One point per QSO and one per QTC reported.
Multiplier is number of EU stations worked on each band.
Final score equals total QSO points plus QTC points by total multipliers.
Mail deadline. Sept. 15th for CW, and Oct. 15th for phone.
D.A.R.C. WAE Contest Committee. D-895. Kaufbeuren. PO Box 262. West Germany.

All Asian DX CW Contest.

1000 GMT. Saturday August 25th to 1600 GMT Sunday August 26th.
Logs to J.A.R.L. Contest Committee, Central Post Office, Box 377, Tokyo, Japan.

Inaugural Gold Coast Radio Club Annual Field Day Contest.

0400 GMT Saturday 1st Sept., to 0400 GMT Sunday 2nd Sept., 1973.
Open to all stations. Portable/Mobile stations will endeavor to contact other Portable/Mobile stations and fixed stations, and vice versa.

Section 1.	(A)	Fixed HF.	(B)	Portable/Mobile HF.
Section 2.	(B)	Fixed VHF	(B)	Portable/Mobile VHF.
Section 3.	(C)	Fixed HF & VHF	(B)	Portable/Mobile HF & VHF.
Section 4.	(A)	Fixed SWL	(B)	Portable/Mobile SWL.

Portable/Mobile may use any power source except at the home address. All multi/ops must be located within a 1m circle and one log, one call sign. Simultaneous operation permitted.

Scoring. Fixed Stations.
1 point to Fixed stations
5 points to Portable/mobile.
10 points to VK40G portable.

Portable/mobile stations.
5 points to Fixed stations.
8 points to Portable/Mobile stations.
20 points to VK40G/P.

One contact with the same station per hour per band.
SWLs score as above but count both stations logged on each contact.
Entries by 1st November to The Contest Manager, Gold Coast Radio Club, P.O. Box 588, Southport, Qld. 4217.
Give the Gold Coast Club a good start for their Field Day Contest.

The 15th Scandinavian Activity Contest.

CW. September 15th & 16th. **Phone** September 22nd & 23rd.
1500 GMT Saturday to 1800 GMT Sunday
Non-Scandinavian's call CQ "SAC" on CW, and CQ Scandinavia on phone.
3.5 through 28 MHz. CW/CW and phone/phone only.
Prefixes . . . LA/LJ/LG., JW, JX, OH, OHO, OJO, OX, OY, OZ and SM/SK/SL.
(a) Single op., (b) Multi op., single TX, (c) Multi op., multi TX (All Clubs). Class (c) separate serials for each band. Usual RS, RST and 3 serials.
One point per QSO. Multipliers . . . Max. of 10 per band, of prefixes above.
Logs to be mailed prior to 16th Oct. to Contest Manager, Alf Almedal, LA5QK., N-4052, Royneberg, Norway.
Here is a chance to work some new countries as QSLs are encouraged.

Contest Calendar

August 11-12th. Worked All Europe DX. CW Contest.
August 18-19th. Remembrance Day Contest.
August 18-19th. S.A.R.T.G. RTTY Contest.
August 25-26th. All Asian CW Contest.
September 1st-2nd. Gold Coast A.R.C. Field Day.
September 8-9th. Worked All Europe DX. Phone Contest.
September 15-16th. 15th Scandinavian Activity Contest. CW.
September 22nd-23rd. 15th Scandinavian Activity Contest. Phone.
October 6-7th. VK/ZL Oceania Phone.
October 13-14th. VK/ZL Oceania CW.
October 13-14th. R.S.G.B. 21/28 MHz Phone.
October 20th-21st. R.S.G.B. 7 MHz CW.
October 27-28th. CQ. WW DX Phone.

Who said the bands are dead????

If you have not yet achieved your DX, DXCC **now is the time!**

VK/ZL Oceania Contest. 1972.

You will be pleased to know, particularly those who helped, that we have bettered the previous contest by around 15%.

In case you become complacent, the improvement was but 10 logs, and you will agree that we should do a lot better in our only international contest. Here is the Division participation table.

VK1	1971-4	1972-4	
VK2	1971-11	1972-20	up.
VK3	1971-6	1972-11	up.
VK4	1971-15	1972-11	
VK5	1971-5	1972-8	up.
VK6	1971-6	1972-4	
VK7	1971-6	1972-3	
VK8	1971-1	1972-3	up.
VK9	1971-3	1972-3	
Total	**57**	**67**	

If VK2 and VK3 had not come good we would have "been down the drain".

How did you come to lose the lead, VK4???

1973 VK/ZL rules appeared in **March 1973 "A.R".** Make sure that you do your bit in 1973.

CW contest

I did a quick count of 878 amateurs in the USSR CQ/M DX CW contest (1972) and was pleased to note we were represented. Thanks VK6WT.

Unofficial CW Contest.

From comments received (not many) it should be worthwhile persisting with this unofficial CW contest for a while. There was not much notice, but about 17 took part in June.

The object is to provide CW practice for VK amateurs, particularly those who are not so confident.

These CW blokes are a pretty good crowd so don't hesitate to come on in the next contest and gain some speed.

Next Contest. 12th August. (3rd Sunday is RD) 6 pm to midnight local.
0800Z to 1400Z. Bands 80, 40, 20 meters.
Usual RST. CW/CW only. VK call areas only.
One point per contact per band per station.
Logs are not required. Just total score and call sign with your comments. 7 cents and an envelope.

1973 B.A.R.T.G. RTTY Contest

Ted Double, G8CDW sent along the results of the British 1973 RTTY Contest in which VK6PG and VK2EG were the only VK's to appear — 23rd and 31st in the list respectively.

GET TOGETHER GANG. WE HAVE A CONTEST COMING UP!

When you listen to Oldtimers and not so old-timers reminiscing, you will find that, invariably their most memorable events were in the company of their gang, team, club, associates, whichever you prefer. When your turn comes, make sure that you have some happy events with the gang to recall.

Of course, I am leading up to multi-operator entries in contests. While the National Field Day is our only opportunity. in VK contests, for multi-ops, there are quite a few overseas contests that cater for multi-ops.

Off hand I cannot recollect when I saw an Oceania multi-op station listed in a results column, except NFD.

What about getting a group together in your locality and putting in a multi-op entry in at least one overseas contest per year.

We have some very strong "operating" clubs who should do well.

Look at the Contest Calendar and pick your contest. ●

Key Section

with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

Since the last list, we welcome the following new members: 44. VK2QL; 45. VK3ANU; 46. VK2AM; 47. VK2HQ; 48. VK2VM; 49. VK2BPR. There has been a bit of delay (on my part) in preparing certificates, fellahs. You should get yours soon.

Frank, VK2QL, qualified with a self-imposed task — 25 different countries on the 5 bands and in all continents. The main aim of the section is to encourage CW activity, but most people choose an easier road than Frank's.

In QSO with VK3AKN some time back he mentioned that he had been practising Russian morse, and (I inferred) making some progress. Anyone else who feels secure enough with the ordinary stuff to join Don? If you haven't lost all your adventurous spirit here's a new world to explore; you don't have to go far, either, as there are a couple of funnies there on 20m. . .

August is RD month, and there is plenty of opportunity for personal satisfaction in the CW section, for swelling your division's total (by actually sending in your log!), and competing in the new annual competition for the President's Cup. I have de-pitted my key contacts — see you in the R.D. ●

Ionospheric Predictions

with Bruce Bathols, VK3ASE August, 1973

7 MHz:—

This band is predicted to provide world wide DX from late afternoon (local time) to well after midnight, providing of course that a spot can be found between the "Commercial" stations. More regular use of this band in the evenings will most certainly result in the removal of intruders

Predictions of the Smoothed Monthly Sunspot. Numbers for August 36, September 34, October 32, November 30 – Smoothed mean for November 1972 – 58.5 – Swiss Federal Observatory, Zurich.

14 MHz

VK2 to SU		1200-1900, 2200-2400
" " ZS		0400 1100
" " G	S.P.	0800 1700, 2100 2200
" " G	L.P.	0600-0900, 2000-0200
" " UA		0900-1700, 2100, 0100
" " W6		0200-1200, 1400-1700
" " PY		2100-0100
VK3 to ZL		2100-0900
" " SU		0300-0400, 1200, 2200-2400
" " KH6		0300-1500, 1700, 2000
" " ZS		0400-1100
" " G	S.P.	1000-1900, 2200-2300
" " G	L.P.	0600-0900, 2100-0100
" " VKO		2200-0800
" " VE3	S.P.	0200-0400, 1200 1600
" " VE3	L.P.	2300 0200
" " UA		0100-0200, 0900-1800
" " W1		0100-0500, 1200 1300, 1600
" " VK9		2100 1700
" " PY		1000, 2200-2400
" " W6		0200 1200, 1400-1700
" " JA		0600-1700, 2100-2400
" " 9G1	S.P.	2300-0300, 0600 0900
" " 9G1	L.P.	0600-1000
VK4 to SU		1200-1700, 2100 0200
" " ZS		0400-1200
" " G	S.P.	0700-1600, 2100 2200
" " G	L.P.	0600 1000, 2000-0200
" " UA		0800 1600, 2100
" " PY		1000, 2100 0100
" " W6		0300 1200, 1500
VK6 to SU		0300 0400, 1200-1400
" " ZS		0400 1300
" " G	S.P.	1200-1800, 2400
" " G	L.P.	0700-1200, 2300-0100
" " UA		0100-0300, 1000-1900
" " PY		0900-1200, 2400
" " W6		0400-1100, 1500 1800
VK7 to SU		0300, 1200, 2300
" " ZS		0400 1100
" " G	S.P.	1100 1200, 2200-2400
" " G	L.P.	0700-0800, 2000-0100
" " UA		0100, 0900-1200, 2200
" " PY		1000, 2200-2400
" " W6		0200 1100

21 MHz

VK2 to SU		0400-0800
" " KH6		2100-0700
" " ZS		0500-0800
" " G	L.P.	2200
" " VKO		0200-0400
" " UA		0500-0800
" " W1		2300-0100
" " VK9		2100-0700
" " W6		2100-0500
" " JA		2200-0700, 0900
" " 9G1	S.P.	0600 0800
VK6 to ZL		2400 0600
" " SU		0400-1100
" " KH6		2300 0800
" " ZS		0500-1000
" " G	S.P.	0700 1100
" " UA		0400-1100
" " VK9		0200-0300
" " PY		1000
" " W6		2300-0500
" " JA		2400-1200
" " 9G1	S.P.	0600-1000
" " 9G1	L.P.	0800-0900

28 MHz

There are several spasmodic openings predicted from most VK areas to various parts of the globe from around Noon local time to late afternoon. Countries situated within or near the tropics feature the best possibilities for propagation.

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P.C. Boards only		$1.50
Transistors only	$7.75	(2N5590)
Stage 3 30W complete		$17.50
P.C. Boards only		$1.50
Transistors only	$9.85	(2N5591)
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obituary

J. R. Goding

To Jim Goding VK3DM, a somewhat unstable and a somewhat distorted cubical quad was "a thing of beauty and a joy forever". The achievement of actually succeeding in keeping his RTTY equipment operational throughout a contest and ending up with a respectable score was indeed significant.

No holiday could be complete without the "gear". A field day was an important occasion, particularly if the technical bugs kept away. A visit overseas was a magnificient opportunity of meeting other amateurs in other countries and also for acquiring a marvellous variety of new components and equipment. On one's return, of course, one had to face up to Her Majesty's Customs who usually, thankfully, gave up in despair. Then one's garage became a warehouse that was the envy of all.

This was the Jim Goding known to so many amateurs not only in Australia but in the U.S.A. and Europe. I can think of few people who personify for me what amateur radio was all about as well as Jim. To him amateur radio was an escape, something to be enjoyed to the full. Innovation and home brewing were to be encouraged and admired.

What most amateurs did not know was that Dr. Goding was a highly respected worker in medical research. He was born in 1915 and graduated M.B.B.S. from the University of Melbourne in 1938. In 1940 he married, and joined the army. Initially he served in the Middle East and then in the Far East. He was a Prisoner of War in Java and Singapore for four years from 1942 to 1945. This was a black period of his life. It was only rarely that he was subsequently to speak of the appalling conditions that he had survived. From 1945 to 1947 he was Senior Registrar at Prince Henry's Hospital and from 1947 to 1948 Medical Superintendent. During that period he commenced studying specialised surgery.

He then joined a busy group general practice in Hartwell. At the same time he continued his surgical studies. Gradually he became more and more involved in experimental surgery with the Physiology Department at the University of Melbourne. At the age of 40, he left general practice to work full time in one of the most complex and highly specialised areas of medical research. It was in this period that he obtained his amateur licence. Initially he was working in primitive conditions, pioneering a technique for the transplantation of the adrenal gland of a sheep from its abdomen to its neck, as well as developing many other experimental surgical techniques. His work had direct application in the treatment of heart disease and hypertension and understanding renal function.

His group subsequently moved into the Howard Florey Laboratories of Experimental Physiology at Melbourne University where his work expanded under ideal conditions. In 1965 he worked for a year at the Worcester Foundation of Experimental Biology in the U.S.A. His work diversified into other areas of endocrinological research, including the development of new techniques for the experimental transplantation of ovaries in animals. His discoveries in this field had direct application in the treatment and control of gynecological condition. He was an author or joint author of more than 110 significant papers.

He had three sons and one daughter. Two of his sons have also obtained amateur licences.

Few amateurs knew that Jim was a medical researcher with a world reputation. To them he was simply an enthusiastic amateur. It was a measure of his enthusiasm that he in fact found time not merely to pursue his hobby but also, in 1972, to serve as a member of the Federal Executive. As a member of the Executive he contributed a deep, practical enthusiasm for improving the amateurs position in respect of the importation of amateur equipment. He also brought an incisive logic to deal with a wide variety of practical matters.

I believe that it would be his wish to be remembered among amateurs as an amateur. I will remember him as a kind and good man. Jim Goding passed away on the 27th June, 1973. ●

MICHAEL OWEN VK3KI

J. R. Goding, VK3DM

L. J. Crooks, VK7BQ

It is with regret that we have to record the death of Len Crooks VK7BQ, on the 24th May. He was Patron of the Tasmanian Division of the W.I.A.

One of the "old timers" of Amateur Radio, Len will be remembered by many of the older citizens of Launceston for the excellent programmes he used to broadcast every Sunday on the 200 metre band. His signature tune "Sunday Afternoon" was eagerly awaited by practically everyone who possessed a radio in Northern Tasmania in the 1920's and early 1930's.

He was keenly interested in every facet of Amateur Radio and operated on all bands 200 metres through to 432 MHz.

His shack was always the focal point of local and visiting Amateurs and his help and advice to those interested in radio was instrumental in several of todays Amateurs first obtaining their Amateur Licence. He played an active part in the foundation of the Wireless Institute of Australia and, until his death, he retained this interest and was a life member of he Tasmanian Division.

Len lived by the Amateur Code and was a true gentleman—one that everyone who has met will always remember with respect.

He will be sadly missed by all and, to his family, we extend our deepest sympathy. ●

L. J. Crooks, VK7BQ

PROJECT AUSTRALIS

with David Hull VK3ZDH. Chairman, Project Australis.

Report on Federal Australis Convention June 23/24

On the weekend of June 23/24 1973, a federal convention of Australis state co-ordinators was held in Melbourne. Together with the Melbourne based Australis personnel were Mr. Alan Hennessy VK2RX, Mr Laurie Blagbrough VK4ZGL, Mr. Colin Hurst VK5ZHJ, Mr. Don Graham VK6HK, and Mr. Peter Frith VK7PF. The fares of some of these gentlemen were subsidised by their own divisions to whom Australis is most grateful.

The meetings proved most useful in that, for the first time, the operations and problems of the Australian participation in the Amateur satellite program could be reviewed on a national scale. The problems relating to the day to day operation of Oscar 6 were discussed, the present plans for Oscar 7 reviewed, and opinions sought on the possible next Australis-Oscar satellite, Oscar 8. One problem that did come to light with regard to Oscar 6 is that a lot of potential users still do not understand how to convert the standard orbit tables published some time ago in A.R. An effort will be made to republish these tables together with a fresh explanation.

Several of the more unusual aspects of Oscar 6 operations were discussed, including Don 6HK's exceptional QSO with ZE7JX, well beyond the normal range of Oscar. The QSL of this contact is reproduced here. It was pointed out that the percentage of Australian amateurs using Oscar is far greater than that of the U.S., despite the restrictions of negligible activity from several of the South East Asian countries within range. On the plus side, some stations such as 5ZHJ are approaching the 500 contacts mark, in Colin's case all on SSB. The continued activity of several DU stations is also keeping interest high "Nets" have been forming on high orbits. My own station, VK3ZDH, is often involved in four ways with the co-ordinators 5ZHS, 7PF, and 6HK. Several 15 min. QSO's have also been noted on 'high' orbits. New Zealand activity continues at a very high level. Once again activity lists are sought from all stations using the satellite so that Australis can let Amsat have the information required for the world wide computerised list being compiled.

The meeting was briefed by Mr. Ed Schoell on Amsat's latest plans following his visit to the U.S. and talks with Amsat management. Mention was made of the probability of very high orbits for Oscar 7, heights as high as 22000 statute miles on apogee, and the power requirements for these hemispherical coverage orbits. It is almost certain at this stage that Oscar 7 will carry.

1. Karl Meinzer 70 cm to 2 m linear translator, 10 watts PEP max. output.
2. Amsat 2 m to 10 m linear translator, 5 watts.
3. Amsat 2 m to 10 m linear translator, 1 watt back-up translator.
4. 2 Beacons. 2 m + 10 m + codestore.
5. Morse code telemetry as per Oscar 6, + Australis RTTY 60 channel telemetry used on 30 data points.

The convention discussed the probable next Australis satellite, Oscar 8, with regard to what should fly. It was generally agreed with Amsat that the proposed Australis 4 channel hard limiting translator is impractical in the light of experience with Oscar 6. Four channels are simply not enough, especially in view of the fact that the loudest signal captures the channel and the signal strength of any one signal will vary from second to second, thus causing the signals to chop in and out. The meeting discussed the merits of a 100 kHz wide hard limiting system as opposed to a 100 kHz linear translator, and came to the opinion that the linear system is more practical in view of the type of communication that amateurs desire. In view of the above it was decided to go ahead with the design and development of Oscar 8 on the following basis.

1. Australis to build a 2m to 10cm linear envelope elimination and restoration translator.
2. Amsat to provide a 2m to 10m translator (as per Oscar 6 or 7).
3. Possibility of 2.3 GHz beacon (Amsat).
4. Three types of telemetry output (A) Australis 60 channel RTTY. (b) Australis P.C.M. system (c) CW system as per Oscar 6.
5. Codestore (Amsat).

A fourth form of telemetry, the AO5 type of variable frequency tone, was discussed but not generally favoured by the meeting. Finance and education was also discussed, as well as a number of problems of local origin.

In general the two day convention, which included a very pleasant social gathering at the QTH of Dr. Hammer VK3ZPI, was a great success. The co-ordinators felt that the advantage of being able to meet the Australis people, and air their grievances in person, was alone worth the effort. In return Australis was able to gather a fresh outlook on their plans and problems. I would like to thank the Divisions concerned for contributing to this success, and a special word to the XYL's who catered so nicely and shared their homes with the interstate visitors.

Project Australis — VK3 — Executive

As a result of the Federal Co-ordinators Conference held in Melbourne on the 23rd and 24th of June 1973, it would appear that the following points need to be re-stated regarding Project Australis.

Apparently it is the opinion in some states that Project Australis is attached to the Victorian Division. It is now made quite clear that this is not the case. Project Australis is controlled directly by the Executive of the WIA, it is funded by the Executive, and is directly responsible to the Executive. In no way does the Victorian Division exercise any control. The fact that Project Australis is resident in Melbourne is purely geographic. The group was founded at Melbourne University!

All state co-ordinators are approved by their respective Divisions.

Finally, Project Australis, is not involved in repeater discussions. This is purely a matter for Executive and the individual States. Project Australis does not influence any decisions, as the satellite frequencies are determined on a world wide basis and not by any one country.

Hamads

HAMADS FOR SALE

MR1OC with A,B,C - $60: Q Meter Marconi TF886A - $80: Q Meter AWA Type No. A50589 - $80: VK3AUI QTHR, Ph. B.H. (03) 615 3275.

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Pre 1930 radio periodicals such as Wireless Weekly; Radio in Australia and N.Z.; Wireless World; QST, etc. Also wireless sets of any type including crystal sets of this period. VK2AAH QTHR Ph. (02) 73-2369.

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It is with deep regret that we record the passing of—

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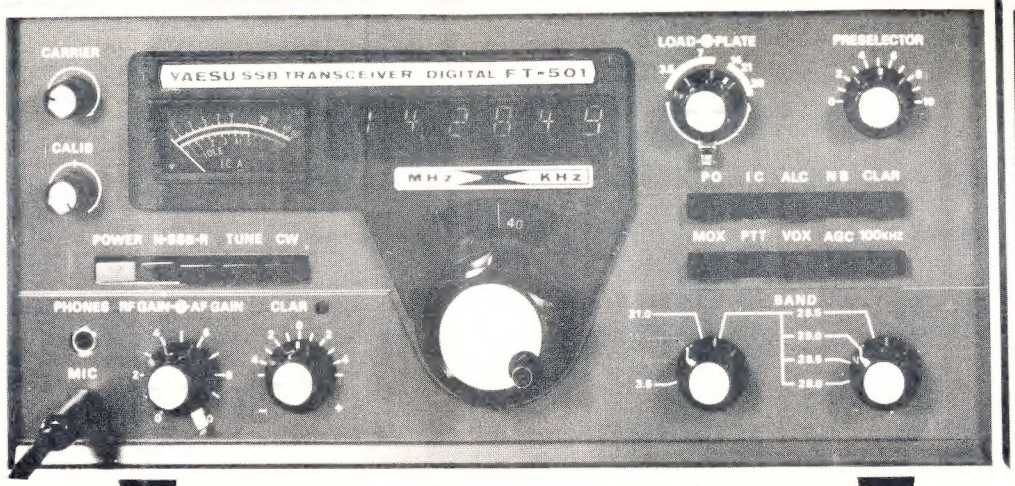

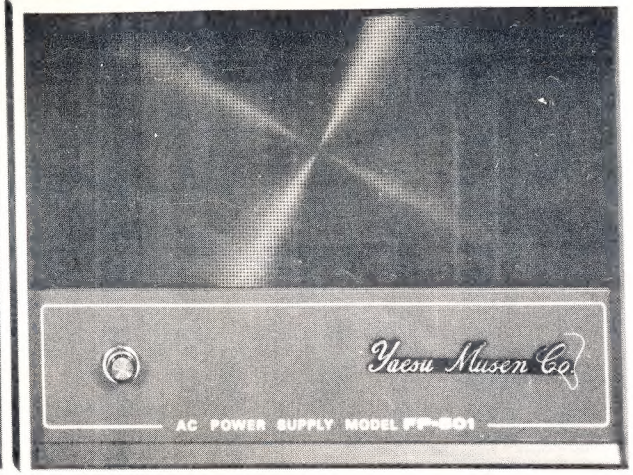

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SPECIFICATIONS

FT-501 DIGITAL TRANSCEIVER

FREQUENCY RANGE :
3.5-4.0MHz, 7.0-7.5MHz, 14.0-14.5MHz, 21.0-21.5 MHz, 28.5-29.0MHz. Crystals optionally available for ranges 28.0-28.5MHz, 29.0-29.5MHz and 29.5-30.0MHz.

TYPE OF EMISSION :
LSB or USB (selectable) CW.

POWER INPUT :
SSB 560 watts (Pep output approx. 350w). (slightly lower on 10 meters.)

CARRIER SUPPRESSION :
40 db.

SIDEBAND SUPPRESSION :
50 db at 1000Hz.

SPURIOUS RADIATION :
Down 40 db or more.

TRANSMITTER FREQUENCY RESPONSE :
300Hz-2700Hz.

DISTORTION PRODUCTS :
Down 30 db or more.

ANTENNA OUTPUT IMPEDANCE :
50-75 ohm unbalanced.

FREQUENCY STABILITY :
Less than 100Hz drift in any 30 minute period after warm-up.

SENSITIVITY :
0.5uV input for 20db S/N.

SELECTIVITY :
SSB 2.4kHz at —6 db, 3.8kHz at —60 db.
CW Filter (option) 600Hz at —6 db,
1.2kHz at —60 db

IMAGE RATIO :
50 db or more.

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AUDIO OUTPUT :
3 watts/5 ohm load (10% THD).

POWER CONSUMPTION :
Receive 140VA, Transmit 650VA max. (with separate power supply Model FP-501, 234V 50Hz A.C.).

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